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## MISCELLANEOUS.

### General.

348. IMPERIAL INSTITUTE. 379: 325  
 Special number commemorating the jubilee of the  
 Imperial Institute 1893-1943.  
*Bull. imp. Inst.*, 1943, 41: 1-75.

An account of the founding of the Imperial Institute and of the work it has accomplished and is doing, contributed by the director, Sir Harry Lindsay, by members of the scientific and technical departments and by the curator and the librarian.

349. RUSSELL, J. 63: 623.451.74  
 Restarting agriculture in devastated Europe.  
*Nature*, 1943, 151: 433-8.

A discourse delivered by Sir John Russell at the Royal Institution, 5 March, 1943. Some of the many problems that will arise are considered and suggestions made for dealing with them.

350. SALISBURY, E. J. 623.451.74: 581.9  
 The flora of bombed areas.  
*Nature*, 1943, 151: 462-6.

The substance of a discourse at the Royal Institution on 19 February, 1943. The most frequent, though not the most abundant, of the flowering plants to appear on bombed sites is the rosebay willow herb, *Epilobium angustifolium*. The plant is specially tolerant of the toxic substances in recently burnt soil, it is remarkably stimulated by nitrates, the production of which is promoted by burning in two ways which are described, and it is extremely prolific of seed, even a young plant yielding about 80,000 seeds in a single season, of a type easily dispersed long distances by air currents. Its habit of underground shoot growth enabling it to form large patches in a season, its height and perennial habit make it a formidable competitor. The common groundsel, *Senecio vulgaris*, is second in importance and two others, *S. squalidus*, the so-called Oxford ragwort, a native of Sicily frequenting volcanic ash and *S. viscosus*, the sticky groundsel, are prominent. A number of other plants are also discussed with special reference to their

means and probable rate of dispersal. It is shown that minute seeds or plumed fruits are much assisted by convection currents, rising columns of heated air which on attaining a height depending mainly on the temperature differences involved, spread out and descend at a distance from the columns approximately equal to the height of the latter. Descent down the walls of the convection cells is facilitated by the accumulation of moisture on the seed hairs and plumes in the upper air. Dispersal is found to be a dual process, a short distance dispersal more or less continuous in space and a long distance dispersal strikingly discontinuous being dependent on the occurrence of favourable circumstances. Discontinuity, always regarded by biologists as a sign of antiquity, may thus, given infrequently favourable environmental conditions but efficient dispersal, also be an attribute of youth.

351. ASSOCIATION OF SPECIAL LIBRARIES AND INFORMATION BUREAUX. 05(47)  
 Scientific and technical periodicals received from the U.S.S.R.  
*Aslib wartime guides to British sources of specialized information* No. 4, 1942, pp. 9 (mimeogr.), 31 Museum St., London, W.C.1., 2s. 6d. (members 1s. 6d.).

### Physiology and anatomy.

352. (THOMPSON, J. McL.) 581.462: 634.462  
 A modern study of cauliflory.  
*Nature*, 1943, 151: 481-2.

A summary of a paper by Professor J. McLean Thompson on cauliflory in the carob intended for Publications of the Hartley Laboratories but now provisionally issued in typescript. An interesting discovery is that endogenous buds regularly form below the cork phellogen covering the swollen wens of tissue bearing the massed secondary inflorescences and burst outwards through cortex and cork to form a tertiary inflorescence. These deep-seated buds lie in pockets filled with a mucilaginous fluid which frees



by digestive action the newly organized bud meristem from the surrounding cortical tissues. They mostly arise opposite the rays, some evidently close to the vascular cambium, a position where, in apple, willow, etc., dormant root initials may be often seen. Endogenous buds on roots are well known, but on stems such as are associated with this cauliflorous habit, they seem to be a new observation.

353. KRAMER, P. J. 631.432 + 631.436  
Species differences with respect to water absorption  
at low soil temperatures.

*Amer. J. Bot.*, 1942, 29: 828-32, bibl. 15.

At Duke University, North Carolina, cooling the soil reduced water absorption in all plants of a number of genera but to a greater extent in those species which normally grow in a soil which is continuously warm. The principal cause of decreased water absorption at low temperatures may be due to an increased resistance to water movement through the root cells brought about by the increased viscosity of the water and the decreased permeability of the root cells. Differences in this respect probably exist between species and would account for their different reactions. A slow rate of cooling produces less severe wilting than a rapid cooling to the same temperature. The practical importance of reduction in water absorption caused by cold soil lies in the fact that it often produces winter injury and even affects the growth of plants in greenhouses.

354. WARNE, L. G. G. 581.144.4  
The supply of water to transpiring leaves.

*Amer. J. Bot.*, 1942, 29: 875-84, bibl. 20.

Data are presented which support the view that under fairly high transpiration rates the root system constitutes a resistance to the flow of water from the soil to the transpiring leaves. The degree of resistance varies from species to species, being lowest for succulents and mesophytes and highest for xerophytes. Root resistance in the complete plant is overcome by the suction force exerted by the solution in the xylem and this suction force is contributed to largely by the tension of the tracheal contents. These tensions develop most considerably in plants whose cell sap has a high osmotic pressure when subjected to conditions that favour high transpiration and may be of value in facilitating water absorption and restricting transpiration. The investigations were carried out at Manchester University, England.

355. COLWELL, R. N. 581.175: 547.25.432  
The use of radioactive phosphorus in translocation studies.

*Amer. J. Bot.*, 1942, 29: 798-807, bibl. 20.

Studies at the College of Agriculture, California, on the rate and direction of transport and upon the localization of radioactive phosphorus under various conditions show that when this indicator is restricted to the phloem its movement is correlated with the food movement in the plant, and can be studied by means of radioautographs and the Geiger counter. [From author's summary.]

356. KRASNOSSELSKAYA, T. A., AND RICHTER, A. A. 631.541.5  
Transport of break of winter dormancy of buds  
along branches of woody plants.

*C.R. Acad. Sci. U.R.S.S.*, 1942, 35: 184-6.

Experiments with *Populus suaveolens*, *Fraxinus* sp. and other shrubs throw some light on how the break in dormancy moves from point to point. From ringing trials it is evident that the break of dormancy originates mainly in the buds from which it is transported to the rest of the branch, the bark also playing a certain part in the process. Further,

by inserting buds which had already broken dormancy on to dormant twigs success was achieved in several cases and the buds of the stock became active. The growth of a bud inserted on an active twig, a usual procedure in horticulture, occurs under the influence of an abundant afflux of substances formed in the living parts of the branch. The break in dormancy would appear to be stimulated by some products of life activity of a hormonal type, which provoke deep changes in the physical and chemical state of the resting cells.

357. STEWARD, F. C. 631.542.24: 581.11  
The effect of ringing and transpiration on mineral uptake.

*Ann. Bot. Lond.*, 1943, 7: 89-92, bibl. 5.

A criticism of a paper by Phillis and Mason (*Ann. Bot. Lond.*, 1940, 4: 645-50; *H.A.*, 10: 1298) in which the critic reasons that all the conclusions at which Phillis and Mason arrive, with one exception which has been known since 1930, seem to be mistaken or unsupported by the facts put forward, and that they increase, rather than dispel, the existing confusion in the literature on the subject.

358. VAN FLEET, D. S. 577.12  
The significance of oxidation in the endodermis.

*Amer. J. Bot.*, 1942, 29: 747-55, bibl. 29.

An oxidase system associated with the development of the endodermis in green plants is considered by the author to be an active oxidation centre responsible for the characteristic appearance and irregularity in the distribution of the endodermis in stem, root and leaf. Experiments are described which give a more exact picture of the nature of the oxidation and reduction in the endodermis.

359. CARROLL, G. H. 577.16: 631.8  
The rôle of ascorbic acid in plant nutrition.

*Bot. Rev.*, 1943, 9: 41-8, bibl. 45.

The precise functions of ascorbic acid in plant nutrition are not known. This paper reviews the literature dealing with the subject.

360. (GREBINSKY, S. O.) 581.192: 612.275.1  
Effects of altitude on the chemical composition of cultivated plants.

*Nature*, 1943, 151: 338, from abstract *C.R.*

*Acad. Sci. U.R.S.S.*, 1941, Vol. 32, No. 4.

In sugar beet cultivated at 2,000 m. in the Alma-Ata district of Kazakhstan there was more sucrose and less non-protein nitrogen than in roots grown at 848 m. In peas there was an increase in monosaccharides from 1.98 to 3.63%, in sucrose from 2.65 to 5.56% and a reduction in ash from 6.77 to 3.45%, while in tobacco at the higher altitude nicotine was 5.44% against 3.58% at 800 m. Barley doubled the average seed weight and had an improved malting quality due to decreased protein and increased carbohydrates.

361. DUTT, B. K., AND THAKURTA, A. G. 577.15.04  
Velocity of longitudinal transport and transverse translocation of root-forming hormone in *Impatiens*.

*Curr. Sci.*, 1942, 11: 366, bibl. 1.

During work on induced root formation in *Impatiens* the rate of translocation of the internal hormone was found to be 1.8 mm/hr. at the apical region, 2.4 mm/hr. at the basal region and 2 mm/hr. throughout the stem. The method of obtaining these results is explained. Defoliation was found to render the stem devoid of the natural internal hormone without which there was no root formation even when there was external application of lanolin paste containing 1%  $\beta$ -indolacetic acid and supply of sugar solution and vitamin B<sub>1</sub>. [The detailed paper will be published in *Transactions of the Bose Research Institute.*]



## Growth substances.

362. AVERY, G. S., JR., BERGER, J., AND SHALUCHA, B.  
577.15.04

Comparative activity of synthetic auxins and derivatives.

*Bot. Gaz.*, 1942, 104: 281-7, bibl. 15.

Results of tests on the activity of indoleacetic, indolebutyric, naphthaleneacetic, dichlorophenoxyacetic and naphthoxyacetic acids and certain derivatives on deseeded *Avena* coleoptiles are here recorded.

363. STEWART, W. S., AND HAMNER, C. L.  
631.531: 577.15.04

Treatment of seeds with synthetic growth-regulating substances.

*Bot. Gaz.*, 1942, 104: 338-47, bibl. 20.

Neither in greenhouse nor field was there any significant increase in growth as the result of soaking seeds of various vegetable and field crops in any of a number of synthetic growth-substances over a wide range of concentrations. The experiments were undertaken by the U.S.A. Bureau of Plant Industry in view of the conflicting evidence on the subject. The confusion may in part be due to differences in the environmental factors under which the various investigations have been made.

364. SWEENEY, B. M.  
577.15.04

The effect of colamine on growth and protoplasmic streaming in *Avena*.

*Amer. J. Bot.*, 1942, 29: 793-7, bibl. 12.

Experiments carried out at the Biological Laboratory, Harvard University, indicate that colamine, one of a number of amines which inhibit the growth of fibroblasts in animal tissue cultures will retard, when in very high concentrations, the rate of streaming in oat four-day-old coleoptiles. It appears to make temporarily unavailable a substance necessary for the action of auxin, possibly a 4-carbon acid.

365. ZIMMERMAN, P. W., AND HITCHCOCK, A. E.  
577.15.04: 581.145.1

Flowering habit and correlation of organs modified by triiodobenzoic acid.

*Contr. Boyce Thompson Inst.*, 1942, 12: 491-6, bibl. 4.

Triiodobenzoic acid was found to have a morphogenetic influence on plants, affecting flowering, growth habits and correlation of organs. Solutions were sprayed on the plants or applied to the soil with similar results. With tomatoes axillary buds normally producing leafy shoots were induced to grow flower clusters as was the main shoot of the plant. The ultimate results, though not immediate, (rapid cell elongation is not induced) more nearly resemble those of true hormones than those obtained with indole and naphthalene substances.

366. HITCHCOCK, A. E., AND ZIMMERMAN, P. W.  
577.15.04

Root-inducing activity of phenoxy compounds in relation to their structure.

*Contr. Boyce Thompson Inst.*, 1942, 12: 497-507, bibl. 2.

The root inducing activity of phenoxy compounds varied from low activity to very high activity depending upon the kind, number and position of substituents in the ring and the relative length of the side chain. [From authors' summary.]

367. BENNETT, R. E., GORDON, S. A., AND WILDMAN, S. G.  
577.15.04

A light-tight box for making shadowgraphs of *Avena* seedlings for growth hormone determinations.

*Plant Physiol.*, 1943, 18: 134-5.

- OSERKOWSKY, J. 577.15.04

Polar and apolar transport of auxins in woody stems.

*Amer. J. Bot.*, 1942, 29: 858-66, bibl. 15.

SMITH, G. F., AND KERSTEN, H. 631.531: 537.531

Auxin and calines in seedlings from X-rayed seeds.

*Amer. J. Bot.*, 1942, 29: 785-91, bibl. 9.

LUNDEGÅRDH, H. 633.11: 581.144.2: 631.415

The growth of roots as influenced by pH and salt content of the medium.

*Ann. agric. Coll. Sweden*, 1942, 10: 31-55, bibl. 26.

The roots concerned were those of wheat.

BURSTRÖM, H. 633.11: 581.144.2: 577.15.04

The influence of heteroauxin on cell growth and root development.

*Ann. agric. Coll. Sweden*, 1942, 10: 209-40, bibl. 41.

Influence of heteroauxin on wheat roots.

## Propagation.

368. MACAULAY INSTITUTE FOR SOIL RESEARCH.

631.532/535

Peat and compost investigations.

*A.R. Macaulay Inst. Soil Res.* 1941-2, pp. 11-7.

Some investigations of horticultural interest carried out by the Macaulay Institute are recorded. 1. Small amounts of some types of peat added to soil decrease its water retaining power, contrary to expectation. 2. Commercial finely ground peat is often unsatisfactory used as or in seeding composts. Experiments with (a) coarse ground sphagnum peat, passing a  $\frac{1}{2}$  in. but not  $\frac{3}{4}$  in. sieve, (b) medium, passing the  $\frac{1}{2}$  in. but up to 75% held on the  $\frac{1}{4}$  in. sieve, (c) finely ground, passing a 1 mm. sieve ( $\frac{3}{16}$  in.) showed that lettuce and tomato seed germinated and grew best on the medium grade whether alone, mixed with sand or as an ingredient of a compost. Results were uniformly bad with finely ground peat whether alone or in mixture and seedlings usually failed to develop satisfactory root growth. 3. As top dressing for a tomato crop a fine and coarse peat were both better than no dressing for retaining moisture, finely ground peat being mechanically less satisfactory than coarse. 4. Basic slag applied to potting composts containing high proportions of peat gave superior results over the superphosphate plots, but if lime was omitted slag was somewhat inferior to super. 5. Peat used as a soil constituent might. it was thought, liberate the potash from biotite schist more rapidly than was experienced with ordinary agricultural soils. Experiment showed, however, that biotite schist must be used in very large quantities to give the same response as sulphate of potash as an initial dressing. 6. Finely ground lime added to peat soils in the quantities shown to be necessary by the lime requirement often reduces the pH still lower for reasons unknown. This was confirmed and lower dressings of lime and grit gave the best results. Heavy watering experiments, 52 litres applied to 5 litres of limed peat over 10 weeks in sufficient quantity to give 1 litre of leachings at each application, showed that less than 10% of lime was lost by leaching and the pH values of the peat had scarcely altered. Phosphate under similar experiments was almost completely leached out in less than 5 leachings, while potash had lost 20 to 90% of the amount added, depending on the type of peat used. The work is continuing. Peat as a compost on potatoes was little better than artificials alone while composts from grass cuttings, soft leaves and old tree litter composted with cyanamide were of the same value as dung, provided the nutrient contents were brought to the same levels throughout. For pot grown tomatoes the value of composts for growth was found to be similar to their nutrient content from whatever organic material they originated. The use of sulphate of ammonia on grass refuse did not improve the rate of composting.



369. GILE, P. L., AND FEUSTEL, I. C.

631.531 + 631.532/535

**Effect of soil and peat admixtures on the growth of plants in quartz sand.**

*J. agric. Res.*, 1943, 66: 49-65, bibl. 12.

In a previous publication it was shown that millet does not grow so well in pure quartz sand as in quartz sand to which a little soil has been added. How the soil admixture improves growth was not shown with certainty. An answer to this question is provided by data reported in the present paper. The beneficial effect of a soil admixture with quartz sand appears to be due to the buffer capacity of the soil and to its capacity for supplying iron. Differences in soil, sand and water cultures as media for growth are pointed out and the importance of considering the hydrogen-ion concentration of the zone contiguous to the root, rather than that of the whole medium, is emphasized. [From authors' summary.]

### Laboratory technique.

370. WHALLEY, H. K.

545.8

**The photoelectric absorptiometer, the polarograph and the spectrograph: a critical review.**

*Chemistry and Industry*, 1942, 61: 495-7.

A review of the analytical uses of these three apparatus with notes on their limitations and a brief comparison of their relative merits.

371. THOMPSON, R. C.

547.944.6

**A technique for treating small seedlings with colchicine.**

*Plant Physiol.*, 1943, 18: 128-30.

In contrast to the high percentage of failures resulting from the treatment of growing points on older plants with colchicine the number of polyploids obtained from the treatment of germinating seeds and small seedlings shows a considerably increased degree of success. An improved technique for this latter operation worked out at the U.S. Bureau of Plant Industry is described. Its advantage lies in the fact that the growing apex of the seedling can be treated without subjecting the radicle and rootlets to injury from the chemical. The method is to divide the interior of a Petri dish into two parts by means of a circle of filter paper covering the bottom of the dish but so folded as to form a raised partition across the dish. The paper is fixed in position with paraffin wax and the ridge is vaselined or the whole paper may be flooded with wax. One section is now filled with water and the other with the colchicine solution. The seedlings to be treated are laid across the ridge with the roots in water or damp cotton and the epicotyls in the colchicine solution. It may be necessary to weight them to keep them submerged. The dish is then covered and placed in the desired light and temperature. After treatment (for 4 to 8 hours usually), the seedlings are removed, washed, dried slightly on absorbent paper, and transplanted to soil where the effect of the treatment can be observed.

372. LUNDEGÅRDH, H. 581.144.4: 581.192: 631.452

**Leaf analysis as a guide to soil sterility.**

*Nature*, 1943, 151: 310-1.

The advantages of leaf analysis as compared with soil analysis are summarized. The plant will indicate more

precisely the availability of the nutrient salts in the soil. Not only is an instantaneous picture of the situation in the soil given but the extraction of salts during a period of several weeks is summed up, the samples being taken at a time when the vegetative parts of a plant are fully grown, but still vigorous. The variability of rainfall and temperature may cause certain variations in respect of leaf analysis but only to a reasonably limited degree. About 800 experiments carried out in different parts of Sweden testify to the practical value of the method.

373. LANCASTER-JONES, E.

771.316.2

**Microfilms in libraries.**

*Proc. 17th Conf. Ass. spec. Lib. Inf. Bur.* Aslib, 31 Museum Street, London, W.C.1, 1942, pp. 34-7, 64-7, 68.

A brief, informative paper followed by a helpful discussion on the problems likely to confront the librarian who proposes to introduce the use of the microfilm.

374. MILLETT, R. S. B.

771.318.3

**A cheap and rapid method of photographing black and white drawings, charts, documents, etc.**

*J. Coun. sci. industr. Res. Aust.*, 1942, 15: 321-2.

A method in which bromide printing paper is used instead of the usual process film has proved very satisfactory and is here described. It is very much cheaper than the film method.

375. DARLING, H. S.

612.014.44

**A note on ecological photometers with special reference to rectifier (selenium) cells.**

*Trop. Agriculture, Trin.*, 1942, 19: 129-30, bibl. 8.

SPRAGUE, V. G., AND WILLIAMS, E. M. 612.014.44

**A simplified integrating light recorder for field use.**

*Plant Physiol.*, 1943, 18: 131-3, bibl. 2.

SIDERIS, C. P.

545.81: 546.72

**Colorimetric microdetermination of iron.**

Reprinted from *Industr. Engng Chem. (Analytical Edition)*, 1942, 14: 756, bibl. 2.

SIDERIS, C. P.

545.81: 546.18

**Improvements in the colorimetric microdetermination of phosphorus.**

Reprinted from *Industr. Engng Chem. (Analytical Edition)*, 1942, 14: 762, bibl. 8.

STRUCKMEYER, B. E.

581.44: 581.192

**The mineral pattern of stems from vegetative and flowering plants as determined by micro-incineration.**

*Science*, 1942, 96: 346, bibl. 3.

WALL, M. E., AND KELLEY, E. G. 581.192: 577.16

**Determination of pure carotene in plant tissues.**

*A rapid chromatographic method.*

*Industr. Engng Chem. (Analytical Edition)*, 1943, 15: 18-20, bibl. 9.

A detailed description.

VEIHMAYER, F. J., EDLEFSEN, N. E., AND HENDRICKSON, A. H.

581.11

**Use of tensiometers in measuring availability of water to plants.**

*Plant Physiol.*, 1943, 18: 66-78, bibl. 14.

## TREE FRUITS, DECIDUOUS.

### General.

376. DAHL, C. G.

631.541.11: 634.1/7-1.537

**Kontroll av fruktträdslantor. I.\* (Control of fruit trees. I.) [German summary.]**

*J. roy. Swedish Acad. Agric.*, 1941, 80: 328-34.

LINDFORS, T.

**Kontroll av fruktträdslantor (sundhetsskontroll).**

II.\* (Control of fruit trees [sanitary]. II.)

[German summary.]

*J. roy. Swedish Acad. Agric.*, 1941, 80: 335-40.

The first article deals with the question of the inspection of fruit nurseries in Sweden, which in the author's opinion is



desirable both for top and small fruit. Testing for purity of varietal strain and of rootstocks is particularly necessary and in addition attention should be paid to other characteristics. Whether the control is voluntary or compulsory it should be carried out under governmental authority. The question needs further investigation.

The second article deals chiefly with the desirability for introducing official sanitary inspection of fruit nurseries. It contains a note of conditions in certain other countries and shows how the question has developed in Sweden. The choice between a voluntary and compulsory system is discussed.

377. MARSHALL, G. W. 634.1/8

**The Rhodesian home orchard.**

*Rhod. agric. J.*, 1943, 40: 19-46.

Comprehensive instructions for the establishing and maintenance of a general purpose orchard for household use under Rhodesian conditions. A list of suitable varieties is given for the different elevations.

378. KARPOV, K. 634.1/8

**Vital problems of Russian horticulture.** [Russian.]

*Plod-jagodn. Kulturny*, 1940, No. 2, pp. 3-11.

It is reckoned that at the end of 1937 the area devoted to orchards and small fruits in the U.S.S.R. was 1,300,000 hectares and that this was increasing at the rate of 100,000 ha. a year. Problems which invited attention as part of the 3rd Five-year plan included the following:—(1) nursery management, (2) how to accelerate fruit bearing in young trees, (3) biennial bearing control, (4) pest and disease control, (5) mechanization and organization of labour, (6) variety selection and production of types suitable for each district.

379. ANON. 664.85.11: 634.11-1.55

*La Deliciosa colorado y Deliciosa comun.*

(Coloured and ordinary apples.)

*Sugest. oportun. Fruticult. Rio Negro*, November, 1942, pp. 2-3.

"Coloured" [? Golden—Ed.] Delicious is acquiring a bad reputation in the Argentine for the development of bitter pit in cold store and for flabbiness of flesh compared to the common Delicious. It is here argued that these conditions are brought about solely by premature picking and that the fault lies with the merchants who insist on the fruit being marketed while prices are high. This is from a month to a fortnight too soon.

380. ZAEČ, V. K. 634.11-1.541.11: 632.111

**Michurin's frost-resistant apple varieties.** [Russian.]

*Sady i Ogorody*, 1941, No. 6, pp. 10-3.

BUZULIN, G. S. 634.11-1.541.11: 632.111

**Michurin's frost-resistant trees for State and Collective farms.** [Russian.]

*Sady i Ogorody*, 1941, No. 6, pp. 9-10.

Reports received at the Michurin Research Station of the resistance of apple varieties to the very hard winter of 1939-40 in different parts of Russia showed that Michurin's varieties were much more frost-resistant than the well known hardy North and Central Russian varieties such as Antonovka and others. Even among Michurin's varieties considerable variation was found to exist in powers of resistance, Tazhnoe, Ermak and Esaulermak being the most resistant. It is suggested that in any new plantings the most cold resistant varieties should be used for the regions with the most severe climates.

Buzulin supports the plea for increased planting of Michurin varieties where necessary and urges increased production of material to meet the need.

\* Translation available at Bureau.

*Propagation and rootstocks.*

381. BROADFOOT, H., AND WHITTAKER, E. C. 631.541: 634.1/2

**The after-care of buds and grafts.**

*Agric. Gaz. N.S.W.*, 1942, 53: 564-6.

The treatments discussed are the cutting back of the budded stock, the handling of growth below the point of union, the treatment of scion shoots. The paper contains much practical advice, the reasons for each operation recommended being fully explained.

382. TUREZKAYA, R. 631.535: 577.15.04

Ueber den Einfluss der Alters der Mutterpflanze auf die Bewurzelung des Stecklinge. (The effect of the stage of growth of a plant on the rooting of its cuttings.)

*C.R. Acad. Sci. U.R.S.S.*, 1941, 33: 78-80, bibl. 3.

Using *Perilla nankinensis* and *Soja hispida* as their material the authors confirm Jahnel's work on lupins in finding that plant hormones become concentrated in the flowers at the beginning of blossoming and later in the fruits and are hence insufficient for root formation. The heteroauxin added acts as a substitute for the natural hormones, stimulating the embryonal tissues and resulting in root formation.

383. WARING, J. H., AND HILBORN, M. T. 634.11-1.541.11

**Developing apple trees on hardy stocks.**

*Ext. Bull. Me agric. Exp. Stat.* 310, 1942, pp. 24.

Notes with ample illustrations on methods of topworking young trees of Virginia Crab and Hiberna raised for the purpose with desirable apple scions. Details are given of budding, and of whip, cleft and inlay grafting.

384. KORSHUNOV, K. N. 634.13-1.541.11

**Mountain ash as a rootstock for pears.** [Russian.]

*Sady i Ogorody*, 1941, No. 6, pp. 25-6.

The author is satisfied by his 30 years' work on different stocks for pears of the superiority of mountain ash (*Sorbus aucuparia*) as a dwarfing rootstock. It has proved better even than Michurin's Northern quince and medlar, particularly as regards its complete resistance to the severest winter conditions. One-year-old scions make good unions and grow out well. Fruitbearing, which is usually very plentiful, starts in the 4th-5th year in the North, but the length of life of the trees is not known. The size, colour and taste of the fruit are normal.

*Pollination.*

385. DICKSON, G. H. 634.1/2: 581.162.3

**Pollination in relation to orchard planning.**

*Bull. Ont. Dep. Agric.* 424, 1942, pp. 11.

The bulletin is written to provide intending orchardists with a planning guide to ensure proper distribution by pollinators. Solid rows of pollinators are advocated as being more convenient for cultural treatments than isolated trees. They should be set so that none are more than 100 ft. away from the farthest tree to be pollinated and there should be a row near the outside edge of the orchard, especially if bees have to work against a prevailing wind. Extreme distances are not advocated. A chart shows blossoming dates for the various commercial apples and plums grown at Vineland. A list of apples, pears, peaches and grapes known to be poor pollen producers is given and of some which are inter-sterile. The grafting of a pollinator branch into each tree in the case of established orchards setting insufficient fruit due to inadequate pollen supply has been very effective. There are a number of useful hints.



386. FABERGÉ, A. C. 638.14

Apparatus for recording the number of bees leaving and entering a hive.

*J. sci. Instrum.*, 1943, 20: 28-31, bibl. 5, 11 figs.

An apparatus giving a continuous record of the number of honey bees leaving and entering a hive is described. Bees pass through a trap, producing electrical impulses. The recording part consists of a magnetic escapement causing a cursor carrying a type figure to travel above the paper. At regular time intervals the position of the cursor is printed, and it is brought back to the zero position. This recorder may find application whenever it is desired to record continuously a rate of impulses. [Author's abstract.]

387. GARNER, R. J. 634.1/2: 581.162.3: 631.541.44

Branch grafting for production of fruit tree pollinators.

*Agriculture*, 1943, 50: 89-92.

Examples of inadequate provision for cross pollination of fruit trees still abound. It is suggested here that this can be quickly remedied without displacing bearing trees by inserting grafts of pollinator varieties among their branches. Little is known about the actual proportion of pollinators required. When whole trees are used the proportion usually advocated is 1 in 9, which means that the closer the planting the greater the number of pollinators. The author suggests that the orchard should be regarded as a whole irrespective of the number of trunks and that a branch of pollinator should be made up for every 30 feet by means of the stub grafting method which is fully described and illustrated. Ten scions are allowed for each branch to be worked amounting at 30 ft. intervals to 500 scions per acre. Suggestions are made as to suitable pollinators and for the care of subsequent growth.

### Growth and nutrition.

388. CRANE, M. B., AND BROWN, A. G. 581.162.3: 634.1/2

The causal sequence of fruit development.

*J. Genet.*, 1942, 44: 160-8, bibl. 39.

In plums different pollinations can result in differences in the time of maturity and in the size of the fruit. The pollen influences the development of the fruit inasmuch as defective embryos promote ripening and smaller fruits. Further, the wider the difference between the two parents, the more defective the embryos. The developmental differences in the fruit are an expression of different degrees of seed growth. In some varieties of pears frost injury to the styles induces parthenocarpy, i.e. the complete absence of embryo development. Difference in the fruit due to the action of the pollen (formerly known as xenia) fall into three classes: (1) where the developing zygote is affected, (2) where the endosperm is affected, (3) where the effect is on the maternal tissues. In classes (1) and (2) the effects or differences are due to the action of paternal genes in heredity, and since they are readily explicable on a simple genetic basis there is no reason why they should continue to be referred to as xenia. In class (3) they are due to differences in the constitution and development of the embryo, endosperm and seed which affect the development of the maternal tissue. At one extreme the fruits are seedless (parthenocarpy), and at the other they have seeds larger than normal. [Authors' summary.]

389. HEILBORN, O. 576.312.35: 634.11 + 634.13

On some effects of primary and secondary polyploidy in apples and pears.

*Ann. agric. Coll. Sweden*, 1941, 9: 116-26, bibl. 13.

The effects concern cross-compatibility and winter hardiness. There are indications only that triploid apple trees are on the average less winter hardy than diploids.

390. LEE, F. A., AND TUKEY, H. B. 634.25: 581.145: 581.192

Chemical changes accompanying growth and development of seed and fruit on the Elberta peach.

*Bot. Gaz.*, 1942, 104: 348-55, bibl. 4.

1. The moisture content, reducing substances calculated as glucose, sucrose, ether extract (fat), total nitrogen, and ash (minerals), are given for the fleshy pericarp, stony pericarp, integument, nucellus and endosperm, and embryo at regular intervals during the growing season at such times as the parts analysed were of sufficient size to permit adequate sampling.
2. The analyses are correlated with morphological development of the plant parts analysed.
3. The data show the importance of careful separation of tissues intended for analyses and the value of considering the morphological nature of developing plant parts in connection with such analyses. [Authors' summary.] The work was carried out at the N.Y. State Agricultural Experimental Station, Geneva.

391. EZELL, B. D., AND GERHARDT, F. 664.85.11: 631.547.6: 634.11

Respiration and oxidase and catalase activity of apples in relation to maturity and storage.

*J. agric. Res.*, 1942, 65: 453-71, bibl. 16.

The effect of maturity on the rate of respiration and on the oxidase and the catalase activity of apples has been studied [at Wenatchee, Wash.]. Respiration decreased during the early part of the growing season and reached a minimum prior to the commercial harvesting of the fruit. The time intervening between harvest and the measurement of the respired carbon dioxide may determine whether or not a later increase is shown. Oxidase activity decreased during the growing season and may or may not increase if the fruit is left on the tree past the normal harvest season. Catalase activity increased throughout the period from July to November. Fruit harvested when fully mature usually showed a higher respiratory activity, a higher catalase activity, and a lower oxidase activity in storage than did fruit picked when less mature. [Authors' summary.]

### Manuring and cultural practice.

392. JOHANSSON, E. 631.8: 634.1/7

Gödsling av fruktträd och bärbuskar. (Manuring of fruit trees and bushes.)

*Sverig. pomol. Foren. Ströskr.* 12, 1939, from abstract *Nord. JordbrForsk.*, 1940, 22: 123.

The brochure (38 pages) contains advice on the use of the various fertilizers in fruit cultivation, the estimation of the manurial requirements, the retention of humus content, etc. In the preparation of the pamphlet results of experiments in Sweden and abroad have been used. The sources of information (some 30 works) are given in notes.

393. RAPSON, A. M., MOORE, L. B., AND ELLIOTT, I. L. 631.873: 631.839

Seaweed as a source of potash in New Zealand.

*N.Z. J. Sci. Tech.*, 1943, 23: 149B-70B.

Seaweed is considered as a wartime substitute for potash fertilizers. *Macrocystis pyrifera*, the only species likely to be exploited in N.Z., was included in Department of Agriculture field trials. Dried and ground it gave responses only slightly inferior to those obtained in control plots with equivalent amounts of 30% potash salts. This kelp grows in extensive fringing and offshore beds, and the floating parts can be cut to a depth of 3-6 ft. without permanent injury to the plant. Growth rates of from 12 to 48 ft. per year are recorded. In N.Z. *Macrocystis* rarely grows north of 40 S, or on the west coast of South Island. It could probably be harvested commercially only in Cook and Foveaux Straits. Beds totalling over 6,000 acres were surveyed, and weight of wet kelp estimated by cutting  $\frac{1}{4}$  square quadrats 3 ft. deep, using a long-handled knife



and a floating wooden frame. KCl in freshly gathered weed ranged from 23 to 33% of dry weight. The total annual yield is estimated at about 5,000 tons of dry kelp containing 1,300 tons of KCl. The finished product is calculated to cost at least £10 per ton, equivalent to approx. £20 per ton of 30% potash salts; it could, if need arises, supply a small part of the country's requirement for potassic fertilizers. L.B.M.

394. PRINCE, A. L., AND BEAR, F. E. 631.876  
Nitrogen content of miscellaneous waste materials.  
*Circ. N.J. agric. Exp. Stat.* 450, 1942, pp. 4.

The waste materials include various animal and bird manures, humus-like materials, crop materials and wastes of various types, e.g. apple pomace, cocoa shells, incinerator ash, etc. In all the analyses as regards N, P<sub>2</sub>O<sub>5</sub> and K<sub>2</sub>O are given for 50 different materials. The circular will be useful for quick reference.

395. FRAPS, G. S., OGIER, T. L., AND ASBURY, S. E. 631.8

**Commercial fertilizers in 1941-42.**

*Bull. Tex. agric. Exp. Stat.* 619, 1942, pp. 45.

In addition to its main contents the bulletin contains brief notes on trials which failed to substantiate claims made for sodium-fluorescein as a fertilizer, on vitamin B<sub>1</sub>, on the use of root stimulants and on fertilizers for water culture.

396. SAVAGE, C. G. 634.1/7-1.67

**Systems of orchard irrigation.**

*Agric. Gaz. N.S.W.*, 1942, 53: 519-21.

Four systems of irrigation in use in N.S.W. orchards are discussed, namely, the furrow, the control flood or border, the contour check and the overhead spray. The advantages and disadvantages of each are analysed.

397. MEZUEV, P. A. 634.23-1.432  
Soil moisture relations in cherry orchards. [Russian.]

*Plod-jagodn. Kulturny*, 1940, No. 2, pp. 91-5.

The author has since 1935 made a careful study of the soil moisture relations in cherry orchards in a district of south-eastern Ukraine which is subject to drought. He found that good yields were directly correlated with a high percentage of soil moisture (1) in spring before the opening of the buds, and (2) resulting from atmospheric precipitation in June-July. He therefore urges that all measures should be taken which can promote such conditions as (1) deep autumn ploughing and breaking down of clods the following summer, (2) retention of snow, (3) irrigation in late autumn or early spring, (4) irrigation after harvest, (5) keeping orchards mulched, (6) preservation of soil mulch, (7) cover cropping to benefit soil structure.

398. SINGH, R. S. 634.1/2-1.542

**Pruning of deciduous fruit trees.**

*Bull. U.P. Dep. Agric.* 18, 1942, pp. 10, 2 annas 6 pies.

This treatise on the pruning of deciduous fruit trees in the United Provinces, India, deals with each kind in turn. The explanations are particularly lucid and simple diagrams give additional aid.

399. COOK, H. H. 631.542.24: 634.1/2

**Bark ringing.**

*Gdnrs' Chron.*, 1943, 113: 119.

Two types of bark ringing of fruit trees are discussed. Knife-edge ringing is performed by cutting two rings  $\frac{1}{4}$  in. apart through the bark with a sharp knife, making two complete circles,  $\frac{1}{4}$  in. above the latent or dormant bud which it is desired to bring into growth. This method is particularly useful with cordons or espaliers. Girdling is a form of ringing in which the bark is removed from the main stem or larger branches, either by removing a strip of bark  $\frac{1}{4}$  inch wide right round the stem (Lee's method) or by removing two half-rings  $\frac{1}{4}$  in. wide and 4 in. apart on opposite sides of the main stem (Gardner's). The bark only should be cut through, leaving the wood uninjured.

The wounds should be protected by covering with soft grafting wax, insulating tape, etc., to ensure the rapid healing essential if fruit size is to be maintained the following season. The correct time for the operation is mid-April for pears and mid-May for apples.

400. CARTER, J. 634.993

**Orchard tree grubbing.**

*Fruitgrower*, 1943, 95: 108, 112.

Different methods of grubbing fruit trees are discussed and hints are given which may improve the speed and efficiency with which the operation is carried out. The best method is either by steam engine and wire drum or by a really powerful crawler tractor and wire cables, but a few trees can profitably be removed by the Australian monkey winch which is operated by two or three men and is a useful implement for a small grower. Cutting through stout surface roots close to the trunk and removing them later by means of a chain slipped under the exposed end may save much subsequent hard labour, especially in the case of large cherry trees which are prolific in these large surface anchor roots.

*Grading and marketing.*

401. MCGILLIVRAY, K. D. 634.22

**Quality grading of prunes.**

*Agric. Gaz. N.S.W.*, 1942, 53: 569.

Quality in prunes is closely linked with maturity, full development of sugar and high specific gravity. The possibility of mechanical separation of grades of both fresh and dried d'Agen and Kobe prunes by flotation in salt solutions of varying densities was investigated from 1935 onwards at Wagga Experiment Farm. The poorer quality prunes floated, the better quality sank, and when the heaviest salt solution was in use, a prune had to be well loaded with sugar to get to the bottom of the vat. Most of the low density floaters, i.e. the poorest quality, were eatable and when included in a bulk sample and processed had little effect upon its quality. Similarly the sinkers in a heavy density solution of 1.21 specific gravity did not produce noticeably better dessert plums than the other grades. Some high-grade fruit floated into lower grades because of a light weight pit or air pockets around the kernel. Wilting of fruit on the trees is another obstacle to gravity grading of fresh prunes. The loss of moisture increases the gravity and allows the fruit, even if immature, to appear in the higher grades. Gravity grading does not at present seem likely to be of service under N.S.W. conditions.

402. BUCHANAN, M. T. 634.11: 658.8

**The marketing of Washington apples in Los Angeles, California. Part III. Consumer use and preference.**

*Bull. Wash. agric. Exp. Stat.* 423, 1942, pp. 32, bibl. 10.

The report gives information on the consumption of apples obtained in a survey conducted among 207 consumers in Los Angeles in the months of January to March 1941. The average monthly consumption per person was 4.4 lb., 62% of this being consumed raw. Of dessert apples Delicious (43% of all varieties) was the most important and was followed by Jonathan (29%). The most important cooker was Yellow Newtown (50%), and Rome Beauty was reported as comprising 31% of those used for cooking in the richer districts. Some 8% of the dessert apples and 15% of the cookers were unknown varieties. Medium-sized apples were most popular. Little attention was paid to grading. About one-third of the consumers kept the apples once bought in refrigerators and profited from the practice.

403. HECKMAN, J. H. 658.8: 334.6: 634+635

**Selling fresh fruits and vegetables co-operatively.**

*Bull. Fm Cred. Adminstr. U.S. Dep. Agric.* 49, 1941, pp. 78.



## SMALL FRUITS, VINES AND NUTS.

404. WOODS, J. J. 634.711-1.8  
The effect of green crops and manurial treatments  
in raspberries.

*Sci. Agric.*, 1942, 23: 247-50.

The experiment laid down at Agassiz Experimental Farm, British Columbia, in 1930 and still continuing with modifications was designed to study the effect of green manure crops on Cuthbert raspberry as compared with barnyard manure, commercial fertilizers and clean cultivation. Plots consisting of two adjacent 50 ft. rows replicated 4 times in randomized blocks were spring-sown with rye, crimson clover or vetch for comparison with plots treated with barnyard manure at 12½ tons per acre, commercial fertilizer 5-10-6 at 750 lb. per acre and clean cultivation. Growth was increased most by the fertilizer and manure treatments but the increase was not reflected in yield owing to winter injury. In this experiment the total long term yields favour rye and clean cultivation but it is assumed that in a more suitable climate the applications of manure and fertilizer would have proved most satisfactory. The only benefit obtained from cover crops was that they curtailed growth and so enabled plants to overwinter with less injury, this being reflected in larger yields. Cover crops did not increase nitrogen or organic content of soil over clean cultivation. Manure increased these values over all treatments. Moisture holding capacity of the soil was not affected by any treatment.

405. MEURMAN, O. 634.723  
Selostus mustien viinimarjapensaiden vertailevien  
kokeiden tähänastisista tuloksista. (Preliminary  
report on black currant variety trials.)

*Valt. Maatalousk. Julk.* 1936, No. 80, from  
abstract *Nord. JordbrForsk.*, 1941, 23: 133-4.

An account is given of trials conducted at the State Horticultural Institute in Piikkiö, Finland, during the years 1932-5. The yield, size and quality of berries, growth habit and hardness of the varieties were investigated. The trials comprised 9 varieties, 5 of which were of indigenous origin. Forty-eight bushes of each variety were included distributed in 6 plots, with a planting distance of  $2.5 \times 1.75$  m. The yield of the different varieties calculated as the average per year varied from Brödtorp 40.5 kg. to Peräpohjola black 6.1 kg. per are.\* The berries were largest in the indigenous varieties Brödtorp, Kajana Seminarium and Osmola Large Black. The weight of 100 berries on the average was for these 98.0, 91.2 and 88.9 gm. The other varieties had considerably smaller berries, corresponding figures for them lying between 73 and 55 gm. In winter hardness also the indigenous varieties were superior, in the following order: Peräpohjola Black, Kajana Seminarium, Äström, Brödtorp and Osmola. Of the foreign varieties, Boskoop, Goliath and Black Naples showed most buds and twigs blighted by frost. The two varieties with the highest yield, Brödtorp and Osmola, resemble one another so closely in most respects that they may almost be regarded as different strains of one and the same variety. Both show the same procumbent habit of growth with long, flexible, twisted branches and large, dark-green leaves. The quality, sweetness and size of the berries are, however, slightly better in Brödtorp. A disadvantage is that the berries in these varieties are somewhat thin-skinned and show a tendency to crack, particularly during damp weather. Particular varieties are recommended for different parts of Finland. The paper concludes with a detailed description of the characters of the varieties investigated.

406. TURNBULL, J. 634.723.1-2.8  
Improving black currant stocks.  
*Agriculture*, 1942, 49: 184-7.

Bad plants and inadequate manuring are responsible for low yields of black currants. The standard can be raised by

\* or 32-5 cwt. per acre.

methods to be described, the key to which is roguing. Roguing can only be done satisfactorily when recognition is easy as on good, clean, normal young plants not overcrowded in the propagating beds. In commerce it is essential to begin with a really good stock requiring a minimum of roguing. Cuttings should be dipped in tar oil wash and older plants sprayed against aphids and other pests. The cuttings should be planted as soon as possible after leaving the parent plant. Delay may mean drying and resultant poor growth. Planting distance for cuttings is not less than 9 in. apart and away from reverted bushes. At the more usual closer spacings the stronger plants may cover the weaker from sight at roguing time and reverted plants, often the weaker, may escape notice. The author suggests that the only way to acquire the art of quick recognition of reversion and varieties is to become so familiar with them that they are recognized instinctively. The characters of reversion are well illustrated in the Ministry of Agriculture's Advisory Leaflet No. 277, "Reversion in black currants", obtainable free from the Ministry. Reversion is best seen at a distance of 3 yards with the sun behind the observer, especially during the month of June when the reverted leaves are at the tops of the leading shoots and can be seen without difficulty. Leaves produced after 30th June are normal in mild cases. Doubtful cases may be decided by counting the sub-main veins on each side of the midrib excluding the main veins that branch off from the stem to the side leaflets. If there are 4 or fewer on each side the leaf is reverted. A reverted plant should be grubbed at once to make sure of it. False reversion is not a disease and can be distinguished mainly by its position and by noting the reason for its occurrence, which may be from forced growth induced by cutting back too low, check to growth by drought or aphids, forked growth due to damaged growing tips or forced growth which occurs naturally in some varieties. Easy recognition characters are given for a number of standard and new varieties.

407. MEURMAN, O. 634.725  
Edeltäviä tietoja karvaismarjapensaskokeista.  
(Preliminary results of trials with gooseberry  
bushes.)

*Valt. Maatalousk. Tiedon.* No. 166, from abstract  
*Nord. JordbrForsk.* 1941, 23: 64.

In Finland in 1933 the State Horticultural Institute initiated an experiment with a number of gooseberry varieties which had been bred from crosses carried out between large-berried European and mildew-resistant American varieties. The results obtained during the years 1934-8 are reported. Fourteen varieties were included, three of them named varieties in general cultivation. The rest consisted of new élites furnished only with strain book numbers. From the weighing results it was possible to divide the varieties into groups according to yielding capacity, high (104-145 kg. on the average per are per year),† medium-high and low (38-67 kg.). A considerable variation in weight of 100 berries occurred also between the different élites, from 186.7 gm. in the variety "Pellervo" to 400 gm. in élite no. 2. The small-berried variety Pellervo was, however, found to possess the highest degree of immunity to American mildew. Otherwise no correlation was found between size of berries and resistance, in fact three of the élites with the largest berries also showed good resistance to the disease. On the average for the period of the experiment only 6.8-5% of the berries of the élites mentioned were infected, while in the varieties in which the disease was most severe more than one-quarter of the berries were attacked by mildew. On the basis of the results obtained the élites nos. 2, 14 and 1 are recommended for general cultivation. They are among the highest yielding varieties in the experiment and have the largest berries, while at the same time they

† or 4-5½ tons per acre.



show adequate immunity to gooseberry mildew. The quality of the berries of élite no. 2 is also particularly good.

408. KNOWLES, D., AND WILK, I. 634.742: 577.16  
Vitamin C (ascorbic acid) content of the buffalo berry.

*Science*, 1943, 97: 43.

The buffalo berry, *Lepargyrea argentea*, a native of N. Dakota, has been found to contain well over 150 mg. vitamin C per 100 g. Buffalo berry jam contained 80 to 90 mg. per 100 g.

409. OLDHAM, C. H. 634.75  
New strawberries.

*Gdnrs' Chron.*, 1943, 113: 77.

A note is given of 2 strawberries of recent introduction now being planted in the Hampshire strawberry area. These are Cambridge Early, a cross between the American Ekey and Royal Sovereign made at the Horticultural Research Station, Cambridge, and Perle de Prague, an introduced variety. It seems as if both may be tolerant of red core disease.

410. CHEAL, W. F., AND OTHERS. 634.75  
Strawberry plants in the fenlands.  
*Fruitgrower*, 1943, 95: 73-4.

Some observations on the deterioration of strawberry plants in the Fens obtained during inspections on behalf of the County War Agricultural Executive Committees. The variety chiefly grown is Brenda Gautrey, which formerly considered as a carrier of yellow-edge without showing symptoms is now beginning to break down. It was found that cultivation conditions had a marked effect upon the appearance of symptoms, thus a higher average number of plants displaying symptoms would be found (a) on the lighter silt soils, (b) in a dry season, (c) when strawberries were intercropped. The practice of intercropping maidens with certain vegetable crops is thoroughly bad. Outstanding stocks approved with reservation are liable to deteriorate if given poor treatment. A variety like Brenda Gautrey chosen for its tolerance must be given the best possible conditions. The erratic behaviour of this variety might be explained on a basis of more than one virus or of strains of one virus having different virulence. Possible situations which might then arise are briefly discussed. Two lines of attack in established strawberry growing areas are possible, namely, the complete control of the vectors of the virus coupled with the propagation of virus free plants and an elucidation of the factors masking the virus symptoms in carriers such as Brenda Gautrey.

411. KAMENSKY, M. M. 634.7-1.8  
The effect of mulches on soft fruits.

*Plod-jagodin. Kulturny*, 1940, No. 2, pp. 85-90.

Farmyard manure, paper, straw and peat were used for mulching raspberries and red and black currants. Both the growth and cropping of raspberries were thereby increased, manure being the most effective. In the case of currants paper mulching was most beneficial in increasing yield.

412. JAZVICKY, M. N. 634.7-1.82  
The effect of liming of soft fruits.  
*Plod-jagodin. Kulturny*, 1940, No. 2, pp. 72-84, bibl. 10.

Soft fruit liming trials with and without manure, both in pots and in the field, were carried out in the Moscow region in 1934 and 1935. Strawberries responded best to lime applied 1-2 years previously, rootgrowth being depressed by liming in the year of planting. The yield of raspberries was increased by liming. Black currants did better with a soil pH of 6.2. Gooseberries needed less lime than the other fruits, the soil pH optimum being 4.6-4.8.

413. DUNNE, T. C. 634.851: 581.162.3  
Pollen-containing sprays for the cross-pollination of Ohanez grapes.

*J. Dep. Agric. W. Aust.*, 1942, 19: 210-3.

The need of the Ohanez grape for cross-pollination with a different variety was established by experiment. Pollination by the use of pollen containing sprays proved even more efficient and much cheaper than the usual practice of hand-pollinating by rubbing. To prepare the sprays bunches of Black Malaga in full bloom were placed in a container and lightly pressed down by hand. To this was added water to occupy about double the volume originally occupied by the flowering bunches. After thorough agitation the resultant suspension was filtered through a fine wire gauze. The concentration achieved was about 30,000 pollen grains per c.c. or 17 million to a pint. The spray was applied through an atomizer operated 18-24 inches from the brushes and the fine spray allowed to float towards the flowers. This resulted in sufficient fruit set to avoid thinning. Thorough wetting with concentrated spray produced a heavy set needing expensive thinning of berries from the too tight bunches. Control of setting to avoid thinning could probably best be obtained by thorough wetting and an adjustment of pollen grain concentration in the spray. The most effective concentration would vary with the frequency of spraying and with the variety of the pollinator. About half the pollen grains remain in good condition in water for some hours, the remainder burst very quickly. Behaviour of the grains in water varies to some extent with the variety. Overhead vines inaccessible to an atomizer have been successfully pollinated by means of a knapsack sprayer.

414. SIDDAPPA, G. S. 634.851-1.547.6  
Ripening changes in some important varieties of grapes.

*Indian J. agric. Sci.*, 1942, 12: 499-522, bibl. 10.

The results are recorded of a detailed investigation into the changes that take place during the ripening of Kishmish and Haitha grapes, being two of the most important varieties of Baluchistan, and some others local and foreign. The limitations for fixing definite and exact standards of maturity are pointed out.

415. GARAVEL, L. 634.51-1.541  
Le greffage du noyer. (Grafting walnuts.)

*Rev. hort. Suisse*, 1942, 15: 199-201.

Walnut scions must be taken from grafted trees, preferably less than 20 years old from the graft. Varieties which, although of high quality, are not very productive should be avoided (e.g. Mayette blanche and Grosse Franquette). The scion, taken in March, should consist of 15 to 20 cm. of 2-year wood plus 25-30 cm. of young wood. If a scion consists entirely of young wood it must be stocky and thus less pithy. Shoots having internodes longer than 8 cm. contain too much pith to be satisfactory. The selected twigs are lightly topped and stored in sand in a dark, cool, but not cold place, such as a cellar, until required. Their tips only should emerge from the sand. Cleft grafting is done in April before the sap rises on stocks not thicker than 8 cm. in diameter. The wedge of scions thicker than 1 cm. should be made with shoulders at the upper end of the cut to rest on the stock top. The cleft in the stock should be so arranged that it is checked by a bud at its lower limit. The cleft should be cut and not split. A cutting implement with a specially thin blade, of which the breadth corresponds apparently to the optimum depth of cleavage, is illustrated as a useful tool for this work. Tying and waxing are as for fruit trees. Crown grafting, in which the scion is inserted between the rind and the wood of decapitated branches, is used for older stocks. The scion wedge is in this case also cut with a shoulder. An alternative method with trees of some size is to head back the branches and cleft graft the more vigorous of the resulting shoots two or three years later. In grafting walnuts a take is assured when the scion buds on starting growth produce red leaves. If the leaves



are green it is a sign of faulty union and the scion will soon die off. Rules making for success are: 1. Use sturdy scions cut and stored early and therefore still dormant and so definitely backward compared with the stock. 2. Do not graft higher on the stock than 3 m. Above this height the percentage of success is reduced. 3. Work as rapidly as possible and on fairly calm days. Wax before tying, including all exposed cut surfaces. 4. Watch the grafts carefully on the following days and give any necessary attention, rewaxing, retying, supports, etc. Even so take is capricious and influenced by stock and scion variety. The highest success percentages are obtained with Franquette on American black walnut and a take of 60% to 80% may be considered very good.

416. DAHL, C. G. 634.54  
Odling av hasselnötter. (Cultivation of hazel nuts.)

Sverig. Pomol. Fören. Ströskr. 12, 1939,  
from abstract Nord. JordbrForskn. 1940, 22: 123.

Concentrated but comprehensive advice is given on the practical methods of hazel cultivation. The laying out of a hazel plantation, manuring, pests and diseases, pruning and harvesting are dealt with. Particular attention is paid to pruning. Twelve varieties are described with respect to their morphological and other characters.

## PLANT PROTECTION OF DECIDUOUS FRUITS.

418. MUHLOW, J. 632.1/9  
Statens växtskyddsanstalts filial i Alnarp. (The branch of the State Plant Protection Institute at Alnarp.)  
Skånska Trädg. Fören. Tidsskr. 1940, No. 4,  
from abstract Nord. JordbrForskn. 1941, 23: 118.

The work of the Plant Protection Institute was until some time ago located at Stockholm, but now a branch has been established in Scania, being housed in the same building as the Scanian branch of the State Central Seed Testing Station. In the paper under review an account is given of the staff, the premises—their arrangement and equipment, experimental grounds and cultivation houses, the research problems and report system of the Plant protection Institute. Special attention is paid to the needs of horticulture.

419. GRAM, E., AND WEBER, A. 632.1+632.3/4+632.8  
Plantesygdomme, Haandbog for Frugtavlere, Gartnere og Haveejere. (Plant diseases, handbook for fruit growers, gardeners and owners of gardens.)  
336 figures and 10 coloured plates. Copenhagen,  
from review Nord. JordbrForskn. 1940, 22: 276-7.

The book contains a full account of plant diseases including those caused by fungi, bacteria, deficiency of micro-nutrient substances, etc. The host plants are dealt with in three main sections: fruit trees and fruit bushes, vegetables, and ornamental plants. The diseases are dealt with under the headings: symptoms, cause and control. In the case of many of the diseases the authors have used results from experiments, investigations and observations which have not previously been published. Thus in referring to chlorosis (iron deficiency) control experiments are mentioned in which iron deficiency was successfully counteracted by adding 100-200 gm. sulphate of iron to 100 litres spraying liquid which was generally bordeaux, broadcasting sulphate of iron at the rate of 200-300 kg. per ha. was also tested, but the effect was found to be slower than with spraying. Other research relates to *Pseudomonas mors-prunorum* which in 1937 was investigated in various plum orchards comprising 2,347 trees; results are reported for the individual varieties of plums. A similar investigation was carried out with cherries.

417. WILLIAMS, H. A. 634.55  
Edible varieties of almonds.  
J. roy. hort. Soc., 1943, 68: 62-5.

The author has analysed samples of most of the decorative almonds grown in England with a view to determining their edibility. Almonds from the varieties *Prunus amygdalus amara* (commercial bitter almond), *P. a. pollardii* (almond-peach hybrid), *P. tenella* (*P. nana*) (dwarf Russian) and *P. amygdalo-persica* (almond-peach hybrid) produce dangerous proportions of hydrocyanic acid and should only be used in small quantities for flavouring. They can be recognized by an unpleasantly bitter taste and a sense of numbness produced in the mouth. *P. amygdalus* (common almond) and *P. a. praecox* are relatively sweet with a good almond flavour and produce only about 1/20 of the HCN yielded by bitter almonds. They can be used in moderation for dessert and flavouring and, as the author puts it, children should not be allowed to eat more than 20 to 50 at a time according to age. *P. a. macrocarpa* and *P. a. dulcis* (sweet almond) have practically no HCN and lack the characteristic almond flavour. They are quite harmless. Samples from decorative almond trees of unidentified varieties were taken at random from various districts chiefly near London. Analyses point to them being all closely related forms of the common almond *P. amygdalus*. Thus they form an attractive and nutritious food which is now largely wasted.

420. KIENHOLZ, J. R. 634.13-2.19: 546.27  
Boron deficiency in pear trees.  
Phytopathology, 1943, 32: 1082-6, bibl. 13.

In Oregon, at the Hood River Experiment Station, applications of borax to the soil in spring eliminated a condition characterized by the pitting of fruits, especially near the calyx end, and by superficial cankers on younger branches. A die-back of twigs follows and the tree dies unless the deficiency is corrected. The symptoms of boron deficiency on fruit are similar to those of the virus disease stony pit but boron has no effect on the latter. It is suggested that the internal cork, bitter pit and crinkle of Bosc and presumably other pears in Australasia is the same as stony pit. Black end of pear fruit attributed by growers to the grafting of commercial varieties on oriental rootstocks was not corrected by boron treatment.

421. SIMPSON, C. P. 634.11-2.19  
Enfermedad de la manzana. (Bitter pit).  
Rev. B.A.P., 1943, 26: 304: 19, 21-2.

The apples Improved Delicious and Glengyle Red are very prone to develop pitting in cold store in the Argentine. This is attributed to the custom of picking them before they are sufficiently mature. Its incidence in other varieties is also discussed.

422. SIMONS, A. O. 634.711-2.111  
Histological study of freezing, desiccation, and winter injury of raspberry canes.  
Bot. Gaz., 1942, 104: 356-61, bibl. 2.

In Latham raspberry from the Colorado Agricultural Experiment Station field injuries believed to have been caused by freezing compared favourably with artificially produced injuries brought about by continuous freezing, alternate freezing and thawing, and desiccation above freezing temperature. The field material showed phloem necrosis and rupture, cambial rupture and the deposition of a tannin-like material in the outer parenchymatous stem tissues. Alternate freezing and thawing produced principally phloem necrosis. Continuous refrigeration produced phloem rupture in dormant, and ruptured cambial cells in non-dormant canes, accompanied by some phloem necrosis. Injuries resulting from desiccation above freezing point

\* See also 379.



show no broken cells, but the sieve tube contents appear to be more shrunken than in normal material and there was marked deposition of the tannin-like material in the region outside the cambium and a more pronounced splitting of the abscission layers in the case of the desiccated canes.

423. RAWLINS, T. E. 632.8  
Recent evidence regarding the nature of viruses.  
*Science*, 1942, 96: 425-6, bibl. 10.

Evidence is presented which suggests that viruses are not molecules. In several respects micrographs of virus particles resemble those of bacteria.

424. BLODGETT, E. C. 634.25-2.8  
Peach wart.  
*Phytopathology*, 1943, 33: 21-32, bibl. 10.

The Idaho Agricultural Experiment Station has investigated a virus disease of peach known as peach wart and tentatively named *Galla verrucosa*. It is reported only from Idaho, Washington and Oregon. Symptoms take the form of smooth or rough outgrowths of fruit tissue particularly near the stylar end. Gumming is often severe. The virus is readily transmitted by budding. The peach is the only known host. The vector is unknown but the leaf hopper *Cicadella hieroglyphica* is suspected and is undergoing trials.

425. NEERGAARD, P. 632.4: 634/635  
Seed-borne fungous diseases of horticultural plants.  
1940, pp. 71, from review *Nord. JordbrForsk.*  
1940, 22: 277.

Forty host plants, beginning with *Allium* spp. and ending with *Zinnia elegans*, are dealt with and about 100 fungi are mentioned. The following information is given on each disease: (1) Latin name with synonyms, (2) common name, i.e. English or American name, (3) author, (4) frequency of disease in seed, and (5) its dissemination and economic importance. The references to literature are very comprehensive and detailed.

426. BUREAU DE LA DÉFENSE DES VÉGÉTAUX. MAROC. 632.4: 634.25 + 634.55  
Les maladies du pêcher et de l'amandier. (Peach and almond diseases.)  
*Memento Dir. Prod. agric. Maroc*, 60, 1941, pp. 17.

The diseases considered are peach leaf curl (*Exoascus* (*Taphrina*) *deformans*), shot hole (*Clasterosporium carophilum*) and *Monilia cinerea*, the last being the most serious. Treatments recommended are:—(1) Spray at leaf fall with alkaline bordeaux (3 kg. sulphate of copper to 100 litres water), (2) Remove diseased wood and mummified fruits at time of pruning, (3) Repeat bordeaux spray combining it with a winter wash, (4) Spray with bordeaux (1 kg. to 100 litres) before bud break, (5) Spray with 1% oxychloride of copper or 0.25% colloidal sulphur when growth has just started, (6) Spray with 1% oxychloride of copper or with 2% self boiled lime-sulphur after blossom fall. Directions are given for preparing the requisite sprays.

427. FAWCETT, G. L. 634.8-2.48  
Una enfermedad comun de la vid. (Vine anthracnose.)  
*Circ. Est. esp. agric. Tucuman* 112, 1942, pp. 2.

Preventive treatment recommended is the painting of the stems in the winter with a mixture made in the following proportions: sulphate of iron 3.5 kg., sulphuric acid (53° Baumé), 70 c.c., water 10 litres.

428. DEMAREE, J. B., AND WILCOX, M. S. 634.73-2.4

Blueberry cane canker.  
*Phytopathology*, 1942, 32: 1068-1075.  
A new and troublesome disease of cultivated blueberry is described from the south-eastern States and U.S.A. The name *Physalospora corticis* n.sp. is proposed.

429. NATTRASS, R. M. 634.11-2.42  
Notes on plant diseases. Apple mildew.  
*E. Afr. agric. J.*, 1942, 8: 101-2.  
With special reference to Kenya.

430. MUNRO, J. W. 632.6/7  
Place of research in the control of injurious insects.  
*Nature*, 1942, 151: 157-60.

It is shown that the opinion often expressed that research and practice are incompatible in wartime is unsound. An account is given in some detail of the many directions in which research controlled by the author had to be carried out in a successful attempt to deal with the infestation of Australian dried sultanas and raisins by the moth *Plodia interpunctella*.

431. VANIN, I. I. 632.6/7: 634.2 + 634.72  
Insect pests [of plum and cherries and black and red currants] and their control.  
*Plod-jagodin. Kultura*, 1940, No. 2, pp. 101-2.  
Anabasine-silico-fluoride in a 0.15% concentration with 0.3% of sodium carbonate and 0.4% of ordinary household soap gave 100% control of *Hyalopterus pruni* Fabr., *Myzus cerasi* Fabr. and *Rhopalosiphum lactucae* Kalt. It was just as efficacious as a mixture of anabasine sulphate (0.3% concentration) with 0.4% household soap in which anabasine base formed 25% of the total content of anabasine sulphate.

432. POLLARD, H. N., AND THOMAS, W. A. 634.75-2.76  
Laboratory tests on the toxicity of insecticides to the strawberry weevil.  
*J. econ. Ent.*, 1942, 35: 599-60.  
Pyrethrin mixture (0.2% total pyrethrins) gave the highest percentage kill, 96%, of *Anthonomus signatus*. Domestic synthetic cryolite-clay, 21% Na<sub>2</sub>AlF<sub>6</sub>, gave 75% kill.

433. SNAPP, O. I. 634.22-2.768  
Further tests of dichloroethyl ether and of jarring to control plum curculio.  
*J. econ. Ent.*, 1942, 35: 514-6, bibl. 1.  
In experiments conducted in a commercial peach orchard 2 applications of 4.5% emulsion of dichloroethyl ether applied at the rate of  $\frac{1}{2}$  gal. per yd. under the spread of the trees + 12 jarrings gave as good control of the plum curculio, *Conotrachelus nenuphar*, in U.S.A. as the regular schedule of lead arsenate sprays.

434. YOTHERS, M. A., CARLSON, F. W., AND CASSIL, C. C. 632.78  
Sprays to kill overwintering codling moth larvae.  
*J. econ. Ent.*, 1942, 35: 450-1.  
Experiments are described which indicate that hibernating codling moth larvae can be readily killed in their cocoons by any of the following sprays—nicotine sulphate (40% nicotine), pyrethrum extract (pyrethrins content 2.5% by weight), 4-6 dinitro-ortho-cresol, dichloroethyl ether emulsified in stove oil and water with either ethanolamine oleate or sodium-lauryl sulphate. A wetting agent or penetrant was necessary to carry the toxicant into the cocoon. Ethylene glycol monobutyl ether 50% and trichloroethylene 50% were used for this purpose.

435. WEBSTER, R. L., AND CARLSON, E. C. 632.78  
Ovicidal value of light mineral oils for the codling moth.  
*J. econ. Ent.*, 1942, 35: 530-3, bibl. 4.  
Evidence is presented which indicates that light petroleum oils (viscosity 50-55) with a high unsulfonatable residue and at a concentration of 0.5% have a high ovicidal value (92% mortality or better) for the codling moth [in U.S.A.]. [Authors' summary.]



436. COPISAROW, M. 632.51  
**Reclamation of bracken land.**  
*Nature*, 1943, 151: 139, bibl. 5.  
 Bracken was successfully eliminated in North Wales on light sandy soil by the following treatment. Late in autumn the bracken was cut, left spread on the ground and a dressing applied of calcium cyanamide (10 lb. per rod) and manganous sulphide (4 oz. per rod). By March the plot appeared bare, the bracken having disintegrated and become embodied in the turfy soil, forming a spongy moisture-retaining surface. A mixture of grass seeds including red and white clover was sown together with soil, 1 lb. per rod, from a pea cultivation. Sand was scattered on the surface. A fine crop of meadow grass including legumes was in evidence by the end of June and by the following summer was well established and free from bracken. The plot was subsequently allowed to revert to bracken which occurred within 6 years. Doubtless proper husbandry would have prevented this. The chemical and biological reactions of the treatment are briefly discussed. The fact that bracken both in growth and decay seems to exert an eliminating effect upon other weeds suggests its use as an intermediate stage in the removal of such resistant types as bindweed, etc. This may be correlated with certain experiments in Cheshire and Lancashire which have established the discriminating action of calcium cyanamide in so far as its efficiency is dependent upon the type of soil, turf and vegetation.
437. BUREAU DE LA DÉFENSE DES VÉGÉTAUX, MAROC. 632.693.2  
 Les rongeurs nuisibles. (Rodent pests of Morocco.)  
*Mémoire Dir. Prod. agric. Maroc*, 59, 1941, pp. 45.  
 An account of the damage done, methods of control and their comparative success and of legislation in force to aid and make safe their control.
438. NEW YORK STATE AGRICULTURAL EXPERIMENT STATION. 634/635: 632.6/7+632.951  
**Current contributions on insect control II.**  
*Bull. N.Y. St. agric. Exp. Stat.* 703, 1943, pp. 64.  
 Twenty-two articles by different workers on phases of current work on pest problems of fruit and vegetables of New York State. It is intended that the articles shall contain new information based on research work which has reached a point where results of scientific and practical importance are ready to be reported on and are of sufficient interest to merit a progress report.
439. FREAK, G. A. 632.951  
**Insecticides.**  
*Chemistry and Industry*, 1942, 61: 429-31, 526-9.  
 The author follows up a general discussion on insecticides with a description of diluents and adjuvants and then proceeds to deal with the particular characteristics of the following:—pyrethrum, cubé, nicotine, anabasine (or neonicotine), coal tar derivatives, phenolic sheep dips, tar oil winter washes, arsenic compounds, sulphur and its compounds, fluorine compounds, copper compounds and petroleum oils.
440. SCOTT, D. J., JR., AND KARR, E. H. 632.951: 631.45  
**The influence of insecticides added to soils on growth and yield of certain plants.**  
*J. econ. Ent.*, 1942, 35: 702-8, bibl. 17.  
 Plant growth, yields and root development of lima beans and bell peppers were greatly reduced at Wenatchee, Washington, by the application of lead arsenate and calcium arsenate to the soil at all concentrations used in the experiment. Natural cryolite had little effect upon the plants other than slight reductions in the length of the tap root in the highest concentration used, 3,000 lb. per foot acre in sandy loam. Soluble fluorine in the soil, derived from the addition of natural cryolite was notably reduced after the experiment. Arsenic remains in soluble toxic form in certain types of soil over a number of years.
441. TRASKE, C. G. 632.95: 634.1/2  
**Grease-banding.**  
*Gdnrs' Chron.*, 1943, 113: 53.  
 A note and illustrations are given of extensive damage to the trunks of apple trees caused by applying grease in error direct to the trunk instead of on a paper band, probably over a series of years. The injury took the form of bark splitting, the fissures varying in length from a few inches to several feet.
442. ROGERS, W. S. 632.95: 634.1/2  
**Grease-banding and bark splitting of fruit trees.**  
*Gdnrs' Chron.*, 1943, 113: 87.  
 The correctness of the assumption that grease-banding material applied direct to the bark of fruit trees can cause fissuring and splitting (see previous abstract) is questioned. Similar damage to that described and illustrated in the communication under criticism can be definitely attributed to frost injury. Instances of this occurred at East Malling Research Station in January, 1940, and were also reported from many parts of the country (see *J. Pomol.*, 1942, 19: 197-207; *H.A.*, 12: 421). The East Malling trees referred to had never been grease-banded. It has been the practice of Kent fruit growers to apply grease direct to tree for the past 15 years without damage to the trunks, even of young trees (5 years old) of varieties susceptible to bark troubles. Even if damage were to be caused by the use of some untried grease-banding substitute it could be expected to appear first as a ring round the bark rather than a longitudinal crack.
443. THURSTON, H. W., JR., AND WORTHLEY, H. N. 634.11-2.952  
**Sulphur and copper sprays in relation to apple-tree growth and yield.**  
*Phytopathology*, 1943, 33: 56-60, bibl. 3.  
 Experiments conducted on young Stayman trees at Pennsylvania State College are recorded. Part of the trees were sprayed with a standard lime sulphur-lead arsenate schedule and an equal number with copper phosphate-lime bentonite-lead arsenate mixture (4-8-4-3-100) over several years. No significant differences as regards injury to buds or flower clusters or in yield could be detected between the trees sprayed and the unsprayed controls. There was significant difference in leaf areas between seasons but not between treatments, including controls. Chlorophyll determinations in mg. per sq. in. of leaf in July and September showed no significant differences between sprayed and unsprayed trees. Average trunk circumference over an 8-year period, while not pronounced, might be taken to indicate that spraying with either sulphur or copper has slowed down average tree growth during the last 4 years. Some correlation was found between growth and crop size. In years when the crop was a failure, usually as a result of frost at blossom time there was a compensating increase in trunk circumference. The unsprayed apples were nearly 100% scabby and dropped early. The loss of crop was reflected in the increased growth of the unsprayed trees. The sprayed trees made less growth because they held their crop and not because they were in any way directly checked through spraying.
444. MONTGOMERY, H. B. S., AND SHAW, H. 632.952  
**Behaviour of thiuram sulphides, etc., in spore germination tests.**  
*Nature*, 1943, 151: 333, bibl. 1.  
 Decrease in toxicity to certain fungus spores (*Venturia inaequalis*, *Macrosporium sarcinaeforme*) as the concentration of fungicide increased was proved in the case of the tetramethyl thiuram sulphides and some other thiuram sulphides and some dithiocarbamates. Though little positive evidence to account for this is available it is probable that the



explanation must be sought in the chemical reaction of these labile substances. The investigations in progress at East Malling are continuing.

445. CLAYTON, E. E. 632.952

**Fungicidal value of the salicylates.**

*Science*, 1942, 96: 366.

The present need for suitable substitutes for copper fungicide increases, particularly for the control of various downy mildew diseases. Research by the American Bureau of Plant Industry in co-operation with the various State experiment stations has obtained promising results with the salicylates of which the most effective so far has been bismuth subsalicylate used at the rate of  $1\frac{1}{2}$  lb. + 1 lb. Vatsol O.T.C. (sodium dioctyl sulphosuccinate) in 100 gal. water. This spray has given strong residual control with no plant injury. The second best has been benzyl salicylate  $\frac{1}{2}$  lb. in 1 gal. cottonseed or soybean oil, emulsified and diluted to 100 gal. Salicylic acid and zinc salicylate  $\frac{1}{2}$  lb. dissolved in 1 gal. oil, emulsified and diluted to 100 gal., are effective fungicides but are likely to cause plant injury. Materials showing some promise compounded at the  $\frac{1}{2}$  lb. rate in oil are butoxyethyl salicylate, dinitrosalicylic acid and salicyl salicylic acid.

446. RUSK, H. W. 634.11-2.95: 581.192

**Rapid method for determination of small quantities of copper on apples when lead arsenate is also present.**

*J. Ass. off. agric. Chem.*, Wash., 1942, 25: 980-7, bibl. 11.

The copper is isolated with diphenylthiocarbazon, the complex formed with it is destroyed with nitric acid and potassium chlorate and the copper finally estimated colorimetrically in the form of carbamate by means of a photo-electric photometer. The samples may be prepared by acid digestion of the peels or by stripping of the whole apple with a solution containing nitric acid and ammonium nitrate.

447. COOMBER, H. E., MARTIN, J. T., AND HARPER, S. H. 632.951.1

**The determination of rotenone in derris root.**

*J. Soc. chem. Ind. Lond.*, 1942, 61: 110-2, reprinted in *Bull. imp. Inst.*, 1942, 40: 179-85.

An improved method for estimating rotenone in derris root, employing the carbon tetrachloride complex separation. Methods of determining moisture content and chloroform extract are also given and their adoption in the U.K. as standard methods is recommended.

448. EDWARDS, K. B. 632.951.1

**Evaluation of derris root.**

*J. Soc. chem. Ind. Lond.*, 1942, 61: 192-4, bibl. 1

The proposed standard method of determining rotenone in derris root given by Coomber, Martin and Harper [see

previous abstract] is criticized and rejected as unsound in many respects, particularly in inadequate instruction as to sampling, in using a chlorinated solvent, in laying undue stress on apparatus and in departing from standard concentrations in the empirical rotenone determination. The method used in umpire analysis by the author is given.

449. KNIGHT, H. 632.951.8

**Some observations on oil deposit.**

*J. econ. Ent.*, 1942, 35: 330-2.

Oil deposit from commercial spray-oil emulsions in the spray tank clogs the spraying apparatus and unless checked hinders spraying operations. The changes undergone in the emulsions to produce this condition are discussed and photographically illustrated.

450. HARTZELL, A. 632.693.2

**Vegetative propagation of red squill.**

*Contr. Boyce Thompson Inst.*, 1942, 12: 481-3, bibl. 5.

It has been found possible to propagate red squill, *Urginea maritima*, vegetatively in U.S.A. The bulbs are sliced longitudinally and the scales of which the bulb is composed are carefully separated and removed from its base. They are set to a depth of 1-1 $\frac{1}{2}$  inches in moist sand in a greenhouse kept at a night temperature of 70° F. The majority of the scales produce bulblets and roots and are then ready for transplanting to soil in 4-inch pots. In view of the shortage of North African red squill, the main source of this raticide, this method of rapid propagation might prove useful. Squill could probably be grown out of doors in the Southern States. It is mentioned that the larger bulbs may weigh as much as 2 kg.

451. JOHNSON, A. C., LIVINGSTONE, E. M., AND BULGER, J. W. 634.2-2.78

**Methyl bromide fumigation to control oriental fruit moth on dormant nursery stock.**

*J. econ. Ent.*, 1942, 35: 674-7, bibl. 5.

SIEGLER, E. H., AND BOWEN, C. V. 632.78

**Toxicity of certain acid amides and their N-substituted derivatives to codling moth larvae.**

*J. econ. Ent.*, 1942, 35: 781-4, bibl. 3.

All materials found useless.

FAHEY, J. E. 634.11-2.951.1

**Compatibility of copper fungicides with nicotine bentonite insecticides.**

*J. econ. Ent.*, 1942, 35: 517-20, bibl. 3.

FAHEY, J. E., CASSIL, C. C., AND RUSK, H. W. 634.11-2.951

**Rapid method of sample preparation for determination of arsenic, copper, lead, nicotine and phenothiazine in spray residues on apples.**

*J. Ass. off. agric. Chem. Wash.*, 1943, 26: 150-5.

## VEGETABLE GROWING.

452. HYLÖ, B. 635.1/7

**Om sortöverflöd och namnförbistring bland köksväxter. (Superfluity of varieties and confusion of names among vegetables.)**

*Skånska Trädgårdens Tidsskr.*, 1940, Nos. 1 and 3, pp. 12 and 56, from abstract *Nord. JordbrForskn.* 1941, 23: 40-1.

During the last two decades the list of vegetables grown in Sweden has decreased appreciably, but it still contains some unnecessary varieties, while in addition the nomenclature leaves much to be desired. Following an account of the variety and strain concepts the author deals with the most important reasons for this confusion and the best measures for remedying it. The number of varieties and strains is increased every year as a consequence of plant breeding.

The products resulting from breeding work in foreign countries are frequently sold in Sweden without being adapted to the country's cultivation conditions. In this way many unnecessary varieties are introduced. In spite of the continued addition of new varieties, the old varieties which the new ones might well replace do not always disappear and a great many old varieties of very poor quality are still in commerce. The confusion of names is increased by old varieties being given new names, particularly those imported from abroad. As the same variety in different countries frequently has different names it may happen that a Swedish firm imports one and the same variety from two countries under two different names. Or again registered varieties and strains are sometimes renamed so that they may be sold by other firms. It is



often difficult to differentiate clearly between the characters of two or more varieties, and as an example two of the commonest greenhouse cucumbers in Sweden, Rochford and Butchers, are cited. Growers' requirements should be restricted to recognized strains of good varieties; in this connexion the results of the strain trials conducted by the State vegetable experiment service can furnish reliable guidance. Possibly import difficulties and the resulting increased indigenous seed production may accelerate standardization. The provision of a restricted list of varieties which can legally be grown might be conceived of as a way out of difficulties of the type discussed in this article.

453. WILSON, J. 635.1/7

**Vegetables for the continuity of supply.**

*J. roy. hort. Soc.*, 1943, 68: 84-8.

A guide to the sowing and transplanting of trustworthy varieties of vegetables which can be grown without protection to ensure continuity of supply. The varieties are carefully selected from the Ministry of Agriculture's "Standard list of vegetable seeds", with a few additions. The information is tabulated under variety, time to sow, time to plant, planting distances, months during which the crop is in use.

454. VAN ELDEN, H. 635.1/7: 631.531

**Production of vegetable seed.**

*Fmg S. Afr.*, 1942, 17: 807-8.

In a previous article (*Ibidem* 17: 425, H.A., 12: 1348) the author dealt with the selection of vegetables prior to their cultivation for seed production in S. Africa. In the present note he stresses the necessity for home production of seed and gives details of the present position. He points out that seed of Boer pumpkin, and Cape Spitzkool have already been successfully raised in the Union. Cauliflower seed also has been satisfactorily produced for the last 10-15 years in the Gamboos Valley, pea seed is produced in the Orange River Islands near Kakamas and onion seed in Oudtshoorn, Willowmore, Franschhoek and Villiersdorp districts. In 1942 a surplus of onion and cauliflower seed appeared likely. Sugar, French bean, pumpkin, pea and eggplant seed was being produced in sufficient quantity for local needs. For the fulfilment of local demand the production of runner bean, carrot, beet, parsnip, leek, spinach, cabbage, squash and tomato seed could be increased. Finally the home production of root crop, lettuce and cabbage seed was quite inadequate. The need is stressed for obtaining a high degree of standardization. Roguing must be carried out to eliminate individuals not true to type and a close watch must be kept on such common weeds as wild carrot, wild mustard, wild melon, etc.

455. NEETHLING, J. H. 635.1/7: 631.531

**Vegetable seed production.**

*Fmg S. Afr.*, 1943, 18: 234-6.

A few hints and warnings to the would-be grower of vegetable seed in South Africa. It is suggested that as regards annual crops the best plan, provided the variety is of desired quality and uniformity, is to select and mark down the best plants prior to harvesting. The selected plants are then allowed to run to seed. In biennials also the best plants should again be selected but in this case the chosen specimens must be removed and replanted in good soil. All bulbs and tubers must be inspected at transplanting. Plants of the *brassica* family present certain problems in the absence of sufficient cold and these are very briefly discussed.

456. VORSTER, P. W. 635.1/7: 631.531

**A sowing chart for vegetables in the Winter Rainfall Area.**

*Fmg S. Afr.*, 1943, 18: 176-80.

Three pages are usefully devoted to a chart showing the appropriate times for sowing and transplanting, distances in and between rows, depth of sowing and approximate amount of seed required when cultivating the chief varieties

of all the vegetables commonly grown in the Union. These would appear to include all vegetables normally grown in England, with the addition of eggfruit, sweet potatoes, chillies, and sweet and water melons.

457. SCHULTZ, W. 635.1: 631.531

**The production of root-crop seed.**

*Fmg S. Afr.*, 1942, 17: 513-4.

In the past all rootcrop seed used in S. Africa was imported. Mangels are regarded as a summer crop in the Union but other root crops such as rape, kale, turnip, swede and chou-moellier which need cool growing conditions are considered as winter crops. For the latter it is thought that the higher middleveld and highveld areas with a comparatively cool late summer and early spring will afford the best conditions, especially for seed production. For mangels the middleveld and lower highveld should be best. Methods suggested for all crops, including mangels, are to leave part of the ordinary crop standing through the winter. The seed pods should be picked when yellowish or the plants should be cut and threshed. Bolters must be removed. For mangels a preferable method is to select well shaped, sound and fully developed plants from the crop and remove them to store till the spring. In doing so care must be taken not to injure the crown. They should be stored in a dry, well-ventilated, frost protected place and planted out after frost danger is past. They can be close in the rows but should have sufficient distance between the rows to allow for hoeing. Planting can be done in furrows or in individual holes, the roots being completely covered with soil. Irrigation may be necessary to give a good start. When the plants begin to send up flowering stalks it is advisable to cut a small piece off the main shoot as this prevents legginess and encourages the growth of laterals. The plants should be harvested only when the seed heads are nearly black and dry. The stems are made into bundles and then put into small stooks where they are allowed to dry until ready for carting and threshing.

458. FILIPPISHIN, I. S. 631.544: 635.1/7

**Growing vegetables under glass. Electric heating of glasshouses and frames. [Russian.]**

*Proc. 8th plen. Session, Section on Fruit and Vegetable Crops Lenin Acad. agric. Sci.* during period 12-18 Jan., 1938, 1939, pp. 53-63.

SHEREMET'EVSKI, P. V. 631.544: 635.1/7

**Growing vegetables under cover. Recent developments. [Russian.]**

*Ibidem*, pp. 103-15.

In the first paper the author discusses the satisfactory results achieved by electric heating and lighting of tomato and cucumber plants under glass in the territory supplied by the great Dnieper power plant. Artificial lighting proved rather costly for use with spinach, lettuce, radishes and onions.

In the second paper notes are given of trials of different media and fertilizers for cucumbers, lettuce and other vegetables under glass. Artificial lighting resulted in greater yields and earlier cropping in cucumbers. Seeds from the lower trusses of tomatoes gave rise to early and large crops. Regular spacing of cucumbers and cauliflowers proved beneficial. Soil warming without glass cover resulted in earlier crops than those from untreated plants in the open. Vernalization of early cabbage seed resulted in 5-10 days earlier ripening and 10-20% greater yield.

459. ODLAND, T. E., AND COX, T. R. 631.85

**Field experiments with phosphate fertilizers.**

*Bull. R.I. agric. exp. Stat.* 281, 1942, pp. 27, bibl. 12.

Results are presented of phosphate fertilizer field trials for the period 1926-39. Crops of interest to this Bureau are reported below. *Potato*. Concentrated superphosphate is as effective as is the ordinary grade. Rock phosphate is



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much less available to this crop. Basic slag and ground bone are both useful. It is necessary to remember that a ton of basic slag has the same neutralizing effect on soil acidity as  $\frac{1}{2}$  ton limestone. Too frequent or too heavy applications may reduce soil acidity to a point where scab becomes a problem. *Cabbage*. Decided benefit was obtained in increased yields from liming as compared with less-limed plots. On limed and less-limed plots bone proved the best source of phosphorus. Rock phosphate was considerably more effective than superphosphate on an equal cost basis. Increasing phosphoric acid to 3 times the standard doubled the yield. Increasing K and N also increased yield. With a very low application of superphosphate the crop was very poor. *Carrot*. On limed plots the difference in yield between the various sources of phosphorus was small. On less-limed plots ground bone and basic slag were the most efficient. Additional superphosphate increased yields on less-limed plots but not on limed plots. Liming generally increased yields. The very low phosphate plots yielded less than the others, but on the whole phosphate requirements of carrot are low. *Parsnips*. No great response to phosphorus except that on the acid series the yield was much decreased where little phosphorus had been used in the fertilizer. Liming was generally beneficial. *Spinach*. A failure on less-limed plots. On limed plots the more quickly available phosphates were the most effective. Ground bone and rock phosphate were of little value. *Spinach* responded heavily to increased P and decidedly to increased N. *Endive* failed almost completely on the less-limed and on the low phosphate and rock phosphate plots. Considering the availability, the cost per unit of effective phosphoric acid, crop yields and the adequacy of supply, ordinary grade and concentrated superphosphate are the best sources of phosphoric acid for fertilizers in the region.

460. PRESTON, N. C. 632.42  
Club root disease. Simplified calomel dust treatment.  
*Fruitgrower*, 1943, 95: 301.

A simpler method of distributing calomel dust than that of applying it to each dibble hole before planting brassicas has proved successful. The plants were (1) dipped 12 at a time in a paste made by mixing 1 lb. 4% calomel dust with 200 c.c. (7 oz.) of water or (2) in a paste made by adding 80 g. pure calomel to 40 c.c. of water. At the conclusion of the experiment, which was set out on heavily infected ground, treatment (1) gave 86.4% of healthy plants, (2) gave 80.0%, while of the untreated controls only 3.3% were completely unattacked. The method introduces little additional labour cost since it is only a modification of the commonly used puddling practice. The actual quantity of material used is much less than when the powder is applied to the holes.

461. GREEN, D. E., AND ASHWORTH, D. 632.42: 635.34/35  
Club root of brassicas. A test on its control.  
*J. roy. hort. Soc.*, 1943, 68: 111-5.

Club root of brassicas at Wisley was best controlled by 4% calomel dust when compared with lime, mercuric chloride (corrosive sublimate), and two proprietary substances together with an untreated control. None of the treatments checked the plants. Lime does not act for several months and this probably accounts here for its lack of strong effect. In the end it may be the best treatment. The calomel was applied by dipping the roots in the dry powder or by sprinkling a teaspoonful of it in each planting hole.

462. WILSON, G. F. 632.76  
A flea beetle trap.  
*J. roy. hort. Soc.*, 1943, 68: 106-7.

A description of an improved flea beetle trap which can be made at home of light wood and cardboard. The trap is

pushed up and down the row of seedlings, which it straddles, causing the beetles to jump on to the greased boards on either side. A cardboard hood is erected over the boards so that high jumping beetles hit the cover and are thrown back on to the sticky boards. There is a photograph and a diagram showing construction and dimension.

463. MILES, H. W. 635.12: 632.76  
Turnip flea beetles.  
*Agriculture*, 1943, 50: 36-8.

PEPPER, B. B. 635.1/7: 632.6/7  
Controlling insects in the home vegetable garden.  
*Circ. N. Jer. agric. Exp. Stat.* 445, 1942, pp. 17.  
Practical direction suitable for New Jersey conditions.

464. WAIN, R. L., AND WILKINSON, E. H. 632.952.1: 631.531

A new copper seed protectant.  
*Gdnrs' Chron.*, 1943, 113: 27, bibl. 1.  
Copper sebacate, though having a lower copper content and a lower average adherence than cuprous oxide, proved equally useful as a fungicide when used as a seed dressing for 3 varieties of garden pea. It also had excellent fungicidal properties when used as a spray on growing tomato plants. The trials were made at Long Ashton and this note is to be regarded as a preliminary report.

465. BLACKMAN, G. E. 632.954  
Weed control in horticultural crops by sulphuric acid spraying.\*  
*Agriculture*, 1943, 49: 219-22.

The spraying of weeds with sulphuric acid just before the sown crop is about to emerge from the soil is very successful in the case of parsnips, onions, leeks, spring-sown carrots and root and any other slow germinating crops. No seedling weed can withstand a mixture made up of 13 gal. commercial sulphuric acid+87 gal. water+1 pint liquid wetting agent of the sulphonated oil type. Modifications to lower strengths (10:90) can be made for certain weeds, of which a list is given, should the population consist mainly of these. A number of common annual weeds show greater resistance which increases rapidly with age, for instance, sow thistle, fumitory and poppy. These should be dealt with at the higher concentration just as the first leaves are developing. Perennial weeds and annual grasses cannot be killed by the acid. With a knapsack sprayer 150 gal. per acre will be needed in the cotyledon stage and 120 gal. when the plants are in the 4-leaf stage. With bigger mechanically drawn sprays 100 gal. per acre is enough. The nozzles should be adjusted vertically downwards so that the spray penetrates the heart of the weed. An onion crop may be kept clean by a pre-emergence spray followed by another in May when the tips of the onion seedlings are no longer bent over. A third spraying may be done in June with more risk, however, of depressing the yield.

466. ROYAL HORTICULTURAL SOCIETY. 633.491  
Potatoes at Wisley 1942.  
*J. roy. hort. Soc.*, 1943, 68: 147-51.

Results of a demonstration trial of 29 varieties of potatoes other than market varieties, with special reference to cooking qualities.

467. GARNER, H. V. 633.491  
Intensified potato culture in the U.S.S.R.  
*Agriculture*, 1943, 50: 20-1.

By a method devised by Professor Lysenko of the Lenin Agricultural Science Society, a small portion of the rose end of potato tubers is cut off and stored for use as seed, leaving the remainder of the tuber fit for consumption. Professor Yakushkin of Timizyazev Agricultural Academy, Moscow, has carried the matter still further. By his method the eyes of the potato with a small piece of flesh attached are scooped

\* See also 513.



out in spring and planted in boxes or forcing houses and transferred to the open in May. Three-quarters of the tuber is thus saved for food and the plants are 15-20 days earlier than those from ordinary seed tubers. In neither system are yields reduced. Two crops per season can be had in certain parts of Russia and the seed from the first crop induced to start into growth within 7-10 days by removing the peel and so allowing oxygen to penetrate to the inside of the tuber. In normal times the methods might not be worth the extra care and trouble, but their value in an emergency might be great.

468. HUTTON, E. M. 633.491

# Breaking dormancy of the potato.

*J. Coun. sci. industr. Res. Aust.*, 1942, 15: 262-7, bibl. 8.

Experiments show that dormancy in the potato can be broken by putting whole or cut tubers for 4-5 hours in acetylene solution made by adding small pieces of calcium carbide to water, the addition being gradual over a quarter of an hour. Such treatment compares favourably in nearly every case with the relatively expensive thiourea treatment. If the treated material is not planted at once it should be kept in a moist warm place for 1-2 weeks to start sprouting when it can be dried off to green and form sturdy sprouts. Acidulated corrosive sublimate treatment for *Rhizoctonia* scab is best given after sprouting has been initiated.

469. HELSON, G. A. H. 633.491-2.78

# Note on the effect of the acetylene treatment of potato tubers on potato moth, *Phthorimaea operculella* Zell.

*J. Coun. sci. industr. Res. Aust.*, 1942, 15: 268-9.

The treatment of seed potatoes mentioned in the previous abstract has no effect on the egg development of the potato moth, but it has a progressive effect on the larvae, most of which are killed after 4 hours' immersion.

470. WESTAS, J. J. 633.491: 577.16

# Factors influencing the vitamin C content of potatoes.

*Ann. agric. Coll. Sweden*, 1941, 9: 285-93, bibl. 9.

In trials at the Agricultural College of Sweden type of manuring had no marked effect on the vitamin C content of potatoes. Soil, however, was important, its effects varying with the weather. Thus in 1938 sandy soil potatoes were richer in vitamin C than loamy soil potatoes, whereas in 1940, a very dry season, there was no significant difference. Fairly large differences were found as between different varieties, but these differences tended to level out as the result of losses in storage. Losses of vitamin C from boiling unpeeled potatoes were very small.

471. COWIE, G. A. 633.491-1.83

# The relative responses of the potato crop to different potash fertilizers.

*Emp. J. exp. Agric.*, 1943, 11: 23-32, bibl. 18.

Examination is made of the available data from 186 experiments comparing the effects of chloride-free and chloride-containing potash fertilizers on the potato crop. Compared with sulphate of potash the mean decreases in yield of tubers per acre resulting from 1 cwt. muriate of potash either with or without dung are not significant. The mean reductions resulting from an equivalent dressing of kainit are, however, 11.6 cwt. without dung and 7.2 cwt. with it. Both muriate of potash and kainit produced highly significant reduction in dry matter content of the tubers and its percentage of starch. Dung does not appreciably reduce the effect of chlorine on the dry matter content of the tubers. A general inverse relationship between rainfall and dry matter content of the tubers was noted. The use of 20 tons of dung depressed dry matter by 1% but no depression resulted from the use of 10 to 12 tons per acre and the normal dressings of complete artificials. Kainit may lead to the production of soapy potatoes and a tendency to blacken after boiling.

472. LARGE, E. C. 633.491-2.411

# Control of potato blight (*Phytophthora infestans*) by spraying with suspensions of metallic copper.

*Nature*, 1943, 151: 80-1, bibl. 5.

Metallic copper sprays showed very marked fungicidal activity against potato blight in field trials in Devonshire and Cornwall. The method finally chosen for preparation of the suspensions from several, which are described, was that of simple dispersion of fine electrolytic copper, or technical (B.D.H.) hydrogen-reduced copper metal. The method gave particles 2-5  $\mu$  in diameter. Dispersal of the copper particles to obtain preparations in convenient practical form for spraying was secured by trituration of the reduced copper, in a dry or moist state (a) with sulphite cellulose extract ("sulphite lye") or (b) with a mixture containing 97 parts bentonite, 2 parts aluminium sulphate and 1 part soda ash by weight. The reasons for using these particular substances are explained. Should these metallic copper sprays prove effective against apple scab (*Venturia inaequalis*) they may be of great value on the copper-sensitive varieties as there seems to be less likelihood of scorch with metallic copper and with its more soluble or reactive compounds.

473. ANDERSON, L. D., AND WALKER, H. G. 633.491-2.76

# Control of flea beetles on potatoes at New Church, Virginia.

*J. econ. Ent.*, 1942, 35: 780-1, bibl. 2.

At the Virginia Truck Experiment Station, U.S.A., calcium arsenate-bordeaux mixture, 4-8-12-100, maintained its superiority against potato flea beetle, *Epidrix cucumeris*, over all other insecticides tried.

474. HENDERSON, M. T., AND LECLERG, E. L. 633.491-1.521

# Studies of some factors affecting fruit setting in *Solanum tuberosum* in the field in Louisiana.

*J. agric. Res.*, 1943, 66: 67-76, bibl. 10.

475. FAITHFUL, W. 633.52

# The linen flax crop.

*N.Z. J. Agric.*, 1943, 66: 23-6.

The success of a linen flax crop depends on good husbandry. The crop requires land of good fertility and uninterrupted growth. Other important factors are the condition of the seed bed, the kind and quantity of fertilizer used and the previous history of the field. These and other points are discussed fully.

476. COLHOUN, J., AND MUSKETT, A. E. 633.52-2.4

# Pasma disease of flax.

*Nature*, 1943, 151: 223-4, bibl. 14.

Pasma disease of flax (*Sphaerella linorum*) has been recorded from Kenya by Dr. R. M. Nattrass. The life history of the fungus is detailed. Though known to occur in America the disease, which can be transmitted by seed, has not so far appeared in the British Isles.

477. WARE, W. M., AND GLASSCOCK, H. H. 633.52-2.4

# Flax rust.

*Agriculture*, 1943, 50: 16-8.

Flax rust (*Melampsora lini*) is widespread and destructive in the South-Eastern counties of England. Its effect is to retard growth and to render the stem brittle at the points of attack. The disease is mainly started each year by means of fragments of infected plants from a previous growth, sometimes mixed with the seed but more often from volunteer plants, chaff and linsed straw, etc., returned to the land as manure from the cattle pens. Early pulling and therefore early sowing (the first week in April) is an advantage in reducing stem damage since the fungus develops late. In U.S.A. the disease has been controlled by raising immune varieties.



478. STUART, A. 633.52  
Handling of the linen flax crop.  
*N.Z. J. Agric.*, 1942, 65: 333-6.  
Harvesting technique.
479. USTENKO, G. P. 633.63-1.8: 581.11  
Photosynthesis and respiration in sugar beet as  
influenced by the staple element of root nutrition.  
*C.R. Acad. Sci. U.R.S.S.*, 1941, 32: 658-60, bibl. 3.  
Effect of mineral salts on photosynthesis in relation  
to the amount of assimilates in the leaf.  
*C.R. Acad. Sci. U.R.S.S.*, 1941, 32: 661-3, bibl. 6.  
In both experiments sugar beet was the plant experimental  
material; in the first potash salts were used, in the second  
salts of various metals. Results indicate that the rate of  
photosynthesis, the accumulation of assimilates and the  
absorption by the plant of other mineral elements are  
closely related to one another.
480. MUIR, R. M. 577.15.04: 633.71  
Growth hormones as related to the setting and  
development of fruit in *Nicotiana tabacum*.  
*Amer. J. Bot.*, 1942, 29: 716-20, bibl. 19.  
Considerable amounts of growth hormone were found in  
portions of pollinated pistils of tobacco, *Nicotiana tabacum*,  
and none or very small amounts in portions of an unpollin-  
ated pistil. The growth hormone concentration was  
closely related to the extent of penetration of the pollen  
tubes into the style. The pollen tubes were not the source  
of the hormones. Possibly the pollen tubes may secrete an  
enzyme which can liberate growth hormones from inactive  
combinations in style and ovary. The growth hormones  
released in the fertilized ovary move downwards through the  
pedicel and prevent the abscission of the pistil by inhibiting  
development of the absciss layer. The hormones may also  
be concerned in the development of the conducting elements  
through which food materials move into the growing ovary.
481. DAWSON, R. F. 633.71: 581.144.2  
Nicotine synthesis in excised tobacco roots.  
*Amer. J. Bot.*, 1942, 29: 813-5, bibl. 5.  
Investigations at the University of Missouri appear to con-  
firm the fact that the root of the tobacco plant alone possesses  
an appreciable capacity for synthesizing nicotine. The  
presence of nicotine in tobacco leaves in greater concentra-  
tions than occur in stalks and roots is ascribed to trans-  
location and accumulation.
482. (SCHMUCK, A., SMIRNOV, A., AND ILYIN, G.) 633.71-1.541.11  
Formation of nicotine in plants grafted on tobacco.  
*Nature*, 1943, 151: 338, abstracted from *C.R.*  
*Acad. Sci. U.R.S.S.*, 1941, Vol. 32, No. 5.  
Grafting experiments show that the formation of nicotine in  
tobacco depends on the root system and on the stem and  
when both these organs are present nicotine can be synthe-  
sized by scions grafted on them even of plants normally  
unable to do so.
483. CLAYTON, E. E., AND SMITH, T. E. 633.71-2.3  
Resistance of tobacco to bacterial wilt (*Bacterium*  
*solanacearum*).  
*J. agric. Res.*, 1942, 65: 547-54, bibl. 7.  
A search for a tobacco (*Nicotiana tabacum*) resistant to  
bacterial wilt has been in progress, mainly without success,  
in U.S.A. since 1934, though over 1,000 collections have  
been made. However a highly wilt-resistant hybrid  
variety of good type, T.I.448A, has been obtained from  
Colombia and seems likely to solve the problem of bacterial  
wilt control. It is also highly resistant to common tobacco  
mosaic.
484. HOPKINS, J. C. F. 633.71-2.8  
The campaign against the krommek virus.  
*Rhod. agric. J.*, 1943, 40: 47-9, bibl. 3.  
The recent strenuous and fairly successful attempts to  
prevent the spread of the tobacco krommek virus in Rhodesia  
are described. This thrips-carried disease has over 200  
known host plants, many being common garden plants and  
weeds. It is feared that should it spread to tobacco the  
industry might suffer heavy damage. The disease was  
first observed in dahlias in 1940 in Bulawayo. The symp-  
toms vary considerably in the different kinds of plant and a  
classified description shows the type of symptom peculiar  
to each of a number of common garden plants. The virus  
is not seed-borne.
485. SCOTT, J. 632.796: 633.71  
Notes on tobacco seed beds. Control measures  
against ravages of black ants.  
*Rhod. agric. J.*, 1943, 40: 16-8.  
The small black harvester ant of Rhodesia, which was  
proving very destructive in tobacco seed beds by carrying  
away the seed, was almost completely controlled on the  
author's farm, Henley Park, Banket, by the broadcasting  
of a thin layer of sand,  $\frac{1}{8}$  in. deep, over the beds immediately  
after sowing. After applying the sand the seed bed is  
thoroughly watered and a grass or other suitable covering  
applied (e.g. muslin) by way of shading. The method was  
suggested by the Entomological Department and is reported  
to have been successfully adopted in Australia.
486. MORRILL, A. W., Jr. 633.71-2.73  
Control of the tobacco thrips on shade-grown  
tobacco in Connecticut.  
*J. econ. Ent.*, 1942, 35: 646-9, bibl. 3.  
*Frankliniella fusca* was controlled sufficiently by impregnated  
pyrethrum dust containing 0.5% of total pyrethrum.  
Results from all the other material tried were inferior or  
unsatisfactory.
487. HOLMES, F. O. 633.71-2.8  
Quantitative measurement of a strain of tobacco-  
etch virus.  
*Phytopathology*, 1942, 32: 1058-67, bibl. 21.  
KNIGHT, C. A. 633.71-2.8  
The physical and chemical properties of a distinctive  
strain of tobacco mosaic virus.  
*J. biol. Chem.*, 1942, 145: 11-7, bibl. 20.  
WOODS, M. W. 633.71-2.944-2.8  
Effect of cyanide on synthesis of ring-spot and  
mosaic viruses in tobacco.  
*Phytopathology*, 1943, 33: 77-80, bibl. 6.  
WYND, F. L. 633.71-2.8  
Respiration of mosaic-infected tobacco plants.  
*Plant Physiol.*, 1943, 18: 90-8, bibl. 21.
488. SALMON, E. S., BEARD, F. H., AND HATTON, R. G. 633.79  
The merits of the new varieties of hops.  
*J. Inst. Brewing*, 1943, 49: 29-33, bibl. 17.  
An attempt to summarize for the grower the mass of  
information available on the following five new hop varieties  
raised by Salmon at Wye and tested at East Malling:—  
Brewers' Favourite (ref. No. 0P21), Quality Hop (ref. No.  
0063), Filppocket (ref. No. Z62), Brewers' Gold (ref. No.  
C9a) and Bullion Hop (ref. No. Q43).
489. SALMON, E. S. 633.79  
Three new midseason hops.  
*Publ. (out of series) S.E. agric. Coll. Wye*, Jan. 1943,  
pp. 8, bibl. 4.  
Three new, mid-season, hops belonging to the Resin Class  
and raised at Wye are introduced with some confidence that,  
now the pioneering work has been done, growers can expect  
that reasonably satisfactory valuations will be given. These  
varieties are particularly rich in soft resins. They are  
Brewers' Stand-by (HH44), Malling Midseason (BB28), and  
College Cluster (N15).



490. SALMON, E. S. 633.79  
Twenty-fifth report on the trial of new varieties of hops 1941.  
Reprinted in *J. Inst. Brewing*, 1943, 49: 9-19.  
For abstract see *H.A.*, 12: 1395.

491. BECKLEY, V. A., AND NOTLEY, V. E. 633.842: 581.192: 577.16  
The ascorbic acid content of sweet peppers.  
*J. Soc. chem. Ind. Lond.*, 1943, 62: 14-6.

The authors come to the following conclusions as the result of their own work in Kenya and that of other workers elsewhere:—Varieties of *Capsicum annum* provide a rich and easily prepared source of ascorbic acid. There are varietal differences but on the whole the pungent varieties are not as rich as the mild and sweet varieties. Among the sweet varieties Hungarian paprika appears to have the highest content. Ascorbic acid increases as the fruits ripen and is not, as previously stated, highest in the green fruit. The ascorbic acid content fluctuates with climatic conditions, being highest when the fruit ripens under warm, dry conditions. The pericarp contains about 90% of the total ascorbic acid. When roughly ground the paprika is suitable as an addition to rations as a vitamin source. It is palatable and has no deleterious effects if not used to excess. The drying of the pericarp is simple and does not require extensive plant. Drying is quickest when the flesh is cut into thin strips, and consequently the ascorbic acid is higher. The dried material contains from 900 to 3,000 mg. of ascorbic acid per 100 g. depending on conditions. Independent work incidentally has shown that the material also contains 50-80 µg. of carotene per 100 g. When stored under airtight conditions the ascorbic acid has not decreased over a period of six months.

492. NILSSON, A. 633.842  
Spansk peppar—en föga känd prydnadsväxt. Resultat av odlingsförsök med några olika sorter för handelsändamål. (Spanish pepper—a little known ornamental plant. Results of cultivation trials with some different varieties for commercial purposes.)  
*Viola*, 1940, No. 10, from abstract *Nord. Jordbr.-Forskn.* 1941, 23: 115-6.

During recent years the cultivation of Spanish pepper (*Capsicum annum*) for bunching flowers has become increasingly general in Swedish nursery gardens. At Weibullsholm Plant Breeding Institute a trial was conducted in 1939 with a number of foreign varieties for ornamental purposes in order to ascertain their cultivation value in Sweden. The results of the trial are reported in the paper under review. In the first place an account is given of the method of cultivation employed; then follow descriptions (illustrated by photographs) of some twenty varieties suitable partly as pot varieties and partly for cutting. The descriptions refer in detail to the characters which influence the usefulness of the varieties for commercial purposes and are supplemented by special advice on the treatment of the individual varieties.

493. WILSON, R. W. 633.844-1.531  
Mustard seed production.  
*Tasm. J. Agric.*, 1943, 13: 94-5.

The seed of white mustard (*Brassica alba*) and brown mustard (*Brassica nigra*) are used in the production of commercial mustard. Brown mustard requires a deep, moist, well-drained soil, free from acidity. White mustard can be grown on a wide range of soils. A major factor for success is the preparation of a firm seed bed with a fine tilth. 1 cwt. of superphosphate per acre applied when sowing is sufficient manure. Autumn or spring sowing can be employed according to local climate. The seed is drilled mixed with the superphosphate in rows 14-18 inches apart, at the rate per acre of 4 lb. of white or 2½ lb. of brown mustard. Sowing depth should not exceed ½ inch and as a

protection against wind the couler ridges should not be rolled until after the seed has germinated. Heavy yields depend upon the crop being given room to branch freely. The crop is cut when the pods assume a brownish tint which may be compared to that of a hare's back. Premature cutting produces shrivelled seed and late cutting may lead to seed shredding. The cutting is done with reaper and binder set to make small sheaves and to leave a high stubble which will hold the sheaves off the ground while drying. The crop must dry thoroughly before carting, cloth being placed on the waggon floor to catch fallen seed. Such seed is spread evenly over the stack and not left in heaps. A good stack bottom of brush wood covered with straw is needed on which again are placed bags or a cloth to collect the fallen seed. Mustard should remain on the stack at least 6 weeks before threshing to allow sweating to subside, otherwise the seed may thresh out soft. The ordinary threshing drum is used subject to some adjusting to prevent seed splitting. The chaff can be used in feeding cattle or horses.

494. EATON, S. V. 633.844-2.19  
Influence of sulphur deficiency on metabolism of black mustard.  
*Bot. Gaz.*, 1942, 104: 306-15, bibl. 17.

Symptoms of sulphur deficiency on *Brassica nigra* were dwarfing, chlorosis of upper leaves, small stiff leaves and thin hard stems. The leaves and stems developed anthocyanin and hair and the young leaves were pimplly. There was a low top:root ratio. The sulphur deficient stems were low in moisture. They carried 4 times as much ammonia, 5 times as much amino acids and 3 times as much amides as the + sulphur stems. They were low in reducing sugars, much higher in sucrose and starch and slightly higher in acid hydrolysable carbohydrates. The chemical composition of the sulphur deficient leaves and stems, its cause and effect are discussed and compared with the effects of sulphur deficiency on plants in general.

495. ZAKHAROV, B. S. 633.85-2.53  
Resistance of sunflower to broomrape in relation to photoperiod.  
*C.R. Acad. Sci. U.R.S.S.*, 1942, 34: 262-4, bibl. 5.

Tests with growing sunflowers and broom rape seed show that irrespective of photoperiod the roots of sunflower contain unvarying amounts of a substance which stimulates the germination of broomrape seed. The fact that broomrape infection increases under conditions of shorter photoperiod is partly due to the slower growth of the host under such conditions.

496. ZAKHAROV, B. S. 633.85-2.53/59  
Physiological aspect of sunflower resistance to broomrape.  
*C.R. Acad. Sci. U.R.S.S.*, 1942, 35: 31-2, bibl. 3.  
Reasons for the different affection of sunflower with broomrape in different regions.  
*C.R. Acad. Sci. U.R.S.S.*, 1942, 35: 53-4, bibl. 8.

Pot and root extract tests showed that the content of root excretions from sunflower plants did not appreciably affect the resistance of sunflower to broomrape. The degree of infection varies in different regions. Tests at Krasnodar lead the author to conclude that this variation in incidence is due to differences in climate and soil, to the different amounts of broomrape seed present in the soil and to differences of strain in the broomrape.

497. LOWENHAUPT, B. 633.85-2.19: 546.27  
Nutritional effects of boron on growth and development of the sunflower.  
*Bot. Gaz.*, 1942, 104: 316-22, bibl. 20.

In this study the influence of boron on the accumulation of materials from the nutrient solution is ascertained from a direct analysis of the plant rather than by the usual method of analysis of the nutrient medium from which the roots absorb the material. Healthy sunflower plants showed

first indications of boron deficiency within 24 hours of transference to a minus-boron nutrient solution. The terminal buds and newly expanding leaves took on a pubescent grey appearance and stem elongation ceased. At harvesting 6 days after treatment had started the younger leaves were curled downwards, the base was a lighter green than the tip and the tissue had become brittle. Black longitudinal streaks visible in the cut stem tip were found to be vascular bundles which had failed to differentiate normally. Boron appears to be essential for the normal distribution of material throughout the plant; in its absence materials ordinarily used in the growth of root and stem accumulate in the leaf. Except in the stem tips which contained a lower percentage, differences in percentage of ash could not be observed.

498. BLACKMAN, G. E. 633.854.54  
Investigations on the cultivation of linseed. 1941  
and 1942 variety trials.  
*Agriculture*, 1943, 50: 12-6.

The American linseed variety Royal in particular of a number tested has proved itself superior in several ways including yield to La Plata, considered in the last war to be most suitable for English climatic conditions. Linseed is not exacting in manurial requirements and because of its resistance to wireworms is recommended as especially suitable for a first or second season crop on ploughed up grassland. It is susceptible to drought and should therefore not be sown on lands which dry out in summer.

499. TRUMBULL, H. L. 633.913  
Growing rubber in North America.  
*Industr. Engng Chem. (Industrial Edition)*, 1942,  
34: 1328-35, bibl. 17.

The author on behalf of the Goodrich (rubber) Company, Ohio, has investigated the position in regard to the production of rubber in U.S.A. from plants able to be grown in that country. All possible sources of information have been examined. At Cornell University, Knudson and others are conducting studies which include experimental plantings and collection of wild materials. The Southern and the Eastern Regional Research Laboratories of the U.S. Department of Agriculture are examining projects to estimate rubber content of plant material by dependable methods and conducting pilot plant studies for the extraction of natural rubber. The Edison-Ford survey, begun in 1927, has provided 17,000 collections or analyses of specimens which are available for study. Improved strains of *Solidago leavenworthii* and *S. edisoniensis* now produce in their leaves an average rubber content of 5 to 6%, or nearly double that of the earlier strains. The estimated yield per acre is 60-90 lb. the first year and twice that amount the second year. The presence of impurities (saponin) complicates rubber recovery. By digesting the 6% rubber leaves with either acid or alkali for short periods at room temperature or higher the rubber content can be increased to 30%. The resulting material is given pebble mill treatment to effect the flotation of the rubber which is thus recovered relatively free from contaminants. The Bureau of Plant Industry is working on *Cryptostegia*, namely *C. grandiflora*, *C. madagascariensis* and a hybrid. The Bureau is also investigating kok saghyz and some account is given of this work. The U.S. Department of Agriculture has taken over the guayule rubber project of the Intercontinental Rubber Co. Some account is given of the technique employed in the growing and processing of this plant. *Chrysothamnus*, the desert growing rabbit brush, is being studied in the Eastern Regional Research Laboratory. Hitherto its slow growth has not favoured domestication and the total stand of wild plants would not produce more than 30,000 tons of rubber. The tropical stations in U.S.A. possess a high yielding *Hevea brasiliensis* resistant to South American leaf disease, but in too small quantity to be of use in the present emergency. The author comments on the comparative

lack on the part of botanists of a conception of rubber in a physical state suitable for commercial use. Hence their reports are often misleading or inadequate to assist in the choice of crop material suitable for rubber production. He discusses the factors to be considered in making this choice and demands that analytical determination of rubber in plant materials be standardized. The article concludes with rather full information on the cultivation and processing of *Cryptostegia grandiflora*. The urgent need is to perfect a process which will extract the rubber satisfactorily from plants such as these. Successful methods would almost certainly bring to light means for processing the many latex producing common weeds which abound all over the country. Future action must depend on the intensive study of the more important technical and scientific phases of the programme.

500. GRIMMETT, R. E. R. 633.913  
Can rubber be grown in New Zealand.  
*N.Z. J. Agric.*, 1942, 65: 325-6.

The methods of growing kok saghyz in Russia and U.S.A. are discussed. The crop is to be experimentally grown by the New Zealand Department of Agriculture.

501. KUPZOW, A. J. 633.913: 581.45  
Division of leaf blade in kok saghyz as a character  
of breeding value.  
*C.R. Acad. Sci. U.R.S.S.*, 1942, 34: 22-6, bibl. 7.

Observations at Toms show that division of the leaf blade in kok saghyz is a direct indication of large roots. This feature is noticeable in other *Taraxacum* species.

502. DROBKOV, A. A. 633.913: 546.65 + 546.432  
Effect of radioactive elements and rare earths upon  
yield and rubber content of kok saghyz.  
*C.R. Acad. Sci. U.R.S.S.*, 1941, 32: 667-8, bibl. 3.

The addition of rare earths in the form of nitrate compounds to kok saghyz plants growing in pure quartz sand supplied with Hellriegel solution + B + Mn resulted in a small increase in root growth and a large increase in rubber percentage. The addition of radium in the form of chloride was more effective in increasing the yield but less effective as regards the rubber content.

503. MIKHAILOV, N. N. 633.913-1.84  
Role of phosphates in the early phases of growth  
and development of kok saghyz.  
*C.R. Acad. Sci. U.R.S.S.*, 1941, 32: 664-6, bibl. 12.

The results of pot experiments carried out by the author in 1940 indicate that a liberal supply of phosphates to kok saghyz plants—growing in a clay loam soil—in the seed and seedling stage induces rapid growth and controls the trend of its biochemical processes. Carbohydrate accumulation is increased. Moreover large quantities of phosphorus are stored as inorganic compounds, which can be turned to good account in the plant's subsequent development.

504. KLECHETOV, A. N. 633.913  
Particular features in the biology of tau saghyz, a  
rubber-bearing plant.  
*C.R. Acad. Sci. U.R.S.S.*, 1942, 35: 288-92.

Tau saghyz is found to need good aeration. It shows a negative response to ammonia. Large applications of nitrogenous fertilizer, especially under conditions of high humidity and poor aeration, result in root rot and very poor growth. There are indications that tau saghyz can assimilate atmospheric nitrogen, possibly by means of a mycorrhiza. The plant may be expected to do better on well-aerated soils, easily permeated by water, rich in lime, sufficiently dry, and high in adsorbents. There are indications, so far unproved, that tau saghyz might respond favourably to the incorporation in the soil of a store of organic nitrogen with carbohydrates, especially inulin.



505. WALKER, J. C., JOLIVETTE, J. P., AND McLEAN, J. G. 632.19: 635.11 + 635.63

**Boron deficiency in garden and sugar beet.**

*J. agric. Res.*, 1943, 66: 97-123; bibl. 26.

The development of symptoms of boron deficiency in young garden beet seedlings grown in quartz sand is described. Internal black spot of garden beet in Wisconsin was found most often in soils of neutral or alkaline reaction. The application of borax to the soil consistently reduced the internal black spot of garden beet and the heart rot of sugar beet. It was found possible to apply the borax with the fertilizer. Applications of borax up to 100 lb. per acre did not alter the canning quality of garden beet. Liming in certain cases resulted in the earlier appearance of boron deficiency in garden beets.

506. JOLIVETTE, J. P., AND WALKER, J. C. 632.19: 635.11 + 635.34

**Effect of boron deficiency on the histology of garden beet and cabbage.**

*J. agric. Res.*, 1943, 66: 167-82; bibl. 33.

The internal phenomena associated with boron deficiency symptoms in garden beet and cabbage grown in greenhouse sand culture and in the field are described.

507. ANON. 635.25

**Onion trials in Scotland.**

*Gdnrs' Chron.*, 1943, 113: 154.

The results are summarized of trials carried out with 15 varieties of onion by the Edinburgh and East of Scotland College of Agriculture at the College Gardens, Liberton, Edinburgh. The seeds were mostly of American origin. The highest yield was obtained with Southport Red Globe, 240 plants giving 9 st. 11 lb., the next best being home saved Southport Yellow Globe with 5 st. 6 lb.

508. ALLO, A. V. 635.25

**Onion growing in New Zealand.**

*N.Z. J. Agric.*, 1943, 66: 17-20.

Onion growing methods suitable for smallholders or farm gardens in New Zealand are described. A variety which is very popular is Pukekohe Longkeeper, a selection of Straw Spanish of greatly improved keeping quality. Other onions grown are Brown Globe, Deptford, Golden Globe, Ailsa Craig and Australian Brown. These all suffer from lack of keeping quality. In South Island an apparent cross between Brown Spanish and Brown or Golden Globe keeps fairly well in favourable circumstances.

509. MYERS, A. 635.25: 631.531.16

**Cold storage of onion seed.**

*Agric. Gaz. N.S.W.*, 1942, 53: 528; bibl. 1.

In experiments, briefly described, it was found that seed of the onion Hunter River White grown in N.S.W. would not maintain its high germination capacity for more than a year when held under natural storage conditions at Sydney. Sealed storage under natural conditions gave 75% germination after 2 years against 27% for the unsealed. Cold storage at 40-50° F. whether sealed or unsealed prevented deterioration for at least 2 years. After about 6 months' storage germination was consistently the quickest in the unsealed, cold storage lots. Unsealed seeds taken from cold store and kept at room temperature for 3 months deteriorated rapidly but sealed lots germinated as well as if they had remained in cold storage.

510. WOODBURY, G. W., AND DIETZ, C. F. 635.25: 631.531

**Onion seed production in Idaho.**

*Bull. Idaho agric. Exp. Stat.* 247, 1942, pp. 14.

About 80% of all domestic onion seed in the U.S.A. is grown in Idaho and California. That from Idaho is mainly produced in the Boise River Valley. Most of it is grown under contract with the seedsman. The chief problems are (1) producing the bulbs, (2) overwintering

them and (3) growing and harvesting the seed crop. In growing for seed the seed is sown (4-6 lb. per acre) rather more closely than for ordinary purposes. In some parts of Idaho bulbs of the hardier varieties can be planted in the autumn. Bulbs, if stored, are kept under cool, dry, well-ventilated conditions, the temperature being maintained round about 35° F. Before planting out again, diseased, off-type and otherwise undesirable bulbs are eliminated. Seed harvest begins as soon as the first fruits open, exposing black seed. The heads are dried either naturally or artificially in corn dryers before threshing.

511. MOSLEY, F. O. 635.25: 632.77

**Onion fly control in the field.**

*Agriculture*, 1943, 49: 222-4.

Describes methods of mixing calomel with the onion seed to obtain proper coverage and the type of drill to be used.

512. NEWHALL, A. G. 635.25-2.653.2

**Pathogenesis of *Ditylenchus dipsaci* in seedlings of *Allium cepa*.**

*Phytopathology*, 1943, 33: 61-9; bibl. 13.

513. BLACKMAN, G. E. 635.261: 632.954

**Weed control in leeks by sulphuric acid spraying.\***

*Agriculture*, 1943, 50: 88-9; bibl. 1.

Concentrations of 64 and 10 gal. commercial sulphuric acid to 100 gal. water controlled weeds among leeks with only a 7% depression in yield as long as the plants were sprayed within a month of setting out and the weeds germinated within that time. The inclusion of a wetting agent, 1 pint per 100 gal., caused no additional harm. Late spraying when plants were large depressed yield by 34%.

514. HERVEY, G. E. R., AND PEARCE, G. W. 632.78: 635.34

**The influence of lime on the toxicity of lead arsenate to cabbage worms.**

*J. econ. Ent.*, 1942, 35: 554-8; bibl. 2.

Results of 2 years' experiments for the control of cabbage caterpillar (*Pieris rapae* and *Autographa brassicae*) with various lead arsenate treatments showed that treatments containing lime gave markedly lower control efficiencies due to an actual reduction in toxicity of the lead arsenate. The explanation of the problem is difficult but may be associated with the formation of calcium arsenate in the insect's gut and the fact that calcium arsenates are frequently less toxic than lead arsenate.

515. LANG, J. M. S. 635.356

**A trial of broccoli varieties in Scotland.**

*Scot. J. Agric.*, 1943, 24: 113-7.

Trials with 12 varieties of broccoli carried out by the Scottish Plant Breeding Station at Corstorphine are reported. Royal Oak proved to be the most outstanding maincrop variety for yield of marketable curds and for the fact that it was the only one to give 100% winter resistance. These qualities were confirmed in a smaller trial carried out in the more severe winter climate of Cupar by the Horticultural Department of the Edinburgh and East of Scotland College of Agriculture. St. George was the best of the earlier, and Midsummer probably the best of the late varieties. The extreme heterogeneity which existed within most of the varieties on trial is noted. Some useful correlations between characters were obtained. Thus the most winter resistant plants tend to be the latest and to have the largest heads, and the biggest plants to be the most resistant. Plants with leaves showing the greatest degree of curliness of leaf margin tended to be the latest and most resistant. Curliness is a useful varietal character since it can be assessed without measurement; but within the variety it is curious to note that the least curly leaved plants tend to be the most resistant. All results were statistically analysed. The need for raising

\* See also 465.

seed locally from strains which can cope with the climate is stressed. This was successfully done during 1942 at the Plant Breeding Station, 1½ cwt. of seed being obtained from ¼ of an acre, giving, on official test, 96% germination.

516. BODDY, F. A. 635.52

Celtnce.

*Gdnrs' Chron.*, 1943, 113: 126-7.

American seeds of celtnce, the succulent stalked lettuce (*ibidem*, 1942, 111: 261; *H.A.*, 12: 963) were sown at Salford in April under glass and planted out in a cold frame 12 x 18 inches apart and given light protection until established. In order to ripen seed with certainty a few plants were potted into 6-inch pots and plunged in ashes on the east side of a greenhouse. Flowering and ripening was completed in a cool greenhouse to which the pot plants were removed when the buds began to open. The plants in the frame were badly damaged, apparently by fumes of some toxic substance blowing from the west, and their culinary qualities could not be ascertained. The potted plants, being sheltered from this side, escaped injury.

517. SIMPSON, A. C. 635.52: 581.143.26.03

Vernalization of lettuce.

*Nature*, 1943, 151: 279-80, bibl. 1.

Lettuce seed of two varieties in Australia germinated and given 28, 42 and 56 days' treatment at 4° C. all produced flowering stalks 14-20 days earlier than the control. At the National Institute of Agricultural Botany, Cambridge, the cabbage type lettuce, Ideal, moistened and kept at 2-8° C. for 16 days formed flowering stalks 20 days earlier than the control and was ready for harvesting for seed 26 days ahead of the controls. The date of hearting lettuce was not affected but the hearted condition lasted only 4 to 5 instead of the 26 days of the control. The vernalized plants suffered less by 50% from *Botrytis* spp. which develops while the hearted plants are compact on the ground. The value of this early seeding in seed production is pointed out.

518. STEPHENSON, R. B. 577.15.04: 635.52

Effects of certain growth regulating substances on growth correlation in lettuce seedlings.

*Plant Physiol.*, 1943, 18: 37-50, bibl. 14.

The effects of certain growth regulatory substances upon young seedlings were studied at the University of Illinois by means of aseptic tissue culture technique whereby four series of cultures could be compared: (1) intact seedlings, (2) excised roots, (3) excised shoots, (4) a combination of excised roots and excised shoots. In these 4 series, thiamin, thiourea, nicotinic acid, naphthalene acetamide, naphthalene acetic acid and indoleacetic acid were added to the culture medium of inorganic salts and sucrose in concentrations of from 0.01 to 10 mg. per litre. Within the control group without added substances it was observed that the excised root growth was slightly benefited by the presence of the shoot in the medium, that adventitious root growth on the excised shoots exceeded that of roots on the intact seedling and that these adventitious roots were still further stimulated when the excised root was present in the medium. In the lower concentrations of thiamin and of nicotinic acid this further stimulation of the adventitious roots by the excised root did not occur. Thiourea did not alter the relationship while naphthaleneacetic acid brought about an increase in growth of excised roots alone both over the control and over those in naphthaleneacetic acid but in the presence of the shoot. This is directly opposed to the relationship of the two excised root series in the control group. Increase in root growth on the intact seedling brought about by naphthaleneacetic acid was greater than the response of adventitious roots on the excised shoot, which in turn was greater when the shoot was alone than when the excised root was also present. This was the reverse of the situation in the control group. The same type of response was noted with indoleacetic acid and in the

response of excised roots to naphthalene acetamide. The growth of roots on all three series of shoots in this last substance followed the trend of the control group. Attention is called to the striking difference between the response of the different parts of the plant to the acid and the amide of the same substance. Problems concerned with the effects of growth regulating substance must be attacked simultaneously with those on growth correlation or any conclusion derived therefrom will be seriously limited in scope. [From author's summary.]

519. GILES, W. F. 635.62

Gourds, marrows, pumpkins and squashes.

*J. roy. hort. Soc.*, 1943, 68: 134-9.

Edible gourds, marrows, pumpkins and squashes belong to 3 species, *Cucurbita pepo*, *C. maxima* and *C. moschata*, but in America, where so many varieties are grown, the popular classification does not agree with the botanical classification. It is now, in fact, often difficult owing to intercrossing to decide what are pumpkins and what are squashes. A number of authors are quoted to illustrate the difficulties of unravelling the tangle. The difficulty is increased by the fact that in England until quite recently American squashes were included in pumpkin while English marrows are in U.S.A. called summer squashes. The farmers' test is quoted as best for practical purposes, that is, when he can stick his thumb-nail into the rind after the fruit has reached full development it is a pumpkin, when he cannot it is a squash as its rind becomes as hard as wood; a further suggestion is that hard shelled fruits having a bitter principle are gourds. A number of varieties of all four types are discussed and attention is drawn to those likely to interest gardeners in Great Britain.

520. KOCH, L. W. 635.63: 632.1/8

Diseases of greenhouse cucumbers.

*Publ. Canada Dep. Agric.* 741, 1942, pp. 12, being *Fmrs' Bull.* 112.

The fungous diseases dealt with are damping off, anthracnose (*Colletotrichum lagenarium*), powdery mildew (*Erysiphe cichoracearum*), Fusarium wilt, stem rot (*Sclerotinia sclerotiorum*) and scab (*Cladosporium cucumerinum*). Bacterial diseases are wilt (*Erwinia tracheiphila*) and angular leaf spot (*Phytophthora lachrymans*). Mosaic is the most important virus disease. Nematodes (*Heterodera marioni*) are also considered. Suggestions for control are made in all cases as also for making good nutritional deficiencies, the symptoms of which are described. Other injurious conditions commented on are those arising from chilling, high temperature and improper watering.

521. ROYAL HORTICULTURAL SOCIETY. 635.64

Outdoor tomatoes at Wisley.

*J. roy. hort. Soc.*, 1943, 68: 88-9.

A demonstration trial of outdoor tomatoes only, using selected varieties from the 1941 trial with 5 varieties not previously grown in the trial.

522. MITCHELL, J. W., AND WHITEHEAD, M. R. 635.64: 577.15.04

Effects of voporous naphthoxyacetic acid on development of tomato fruits, with special reference to their vitamin C content.

*Bot. Gaz.*, 1942, 104: 362-5, bibl. 7.

In experiments at the U.S. Bureau of Plant Industry Station, Beltsville, Maryland, Marglobe tomato plants fumigated in a greenhouse with vaporized  $\beta$ -naphthoxyacetic acid when the earliest flowers of each successive cluster opened gave from 50% to 98% of seedless fruits. Vegetative growth was scarcely affected. With Bonny Best the same results were obtained; there was no alteration in vitamin C or ash content of the fruits of the treated plants or any significant difference in the size, fresh weight percentage of solids, colour or flavour when ripe of treated and control fruits.



523. WENT, F. W. 635.64: 581.144.2  
Effect of the root system on tomato stem growth.  
*Plant Physiol.*, 1943, 18: 51-65, bibl. 17.  
The conditions under which the root system (of greenhouse grown tomatoes in this case) exerts its influence on stem growth were studied at the California Institute of Technology. Present knowledge justifies the conclusion that roots supply to the growing region of the shoot a factor or factors known as caulocaline, indispensable for stem growth. In many plants and in those under experiment this factor develops only when some of the roots are exposed to moist air, even though they cannot take up organic materials. Thus when all the roots were submerged in a nutrient solution of pH 6 or higher even aeration could not prevent chlorosis and a drop in the growth rate of stems, though root growth was satisfactory. As soon as a portion of the root system developed in moist air stem growth became maximal. Presumably caulocaline is formed only in roots surrounded by moist air and travels upwards in the stem, apparently under the influence of auxin through the living elements of the vascular bundle. Incidentally it is suggested that the pneumatophores of mangrove serve as media not for gas exchange and air intake between the air and the roots deep in the mud, but for the production of caulocaline required for stem growth. Applying the data to practice it is concluded that the advantage of hydroponics over the old water culture method lies in the fact that the functions of the root system are able to be divided. One part of the root system takes up water and salts while the other in the seed bed or between the seed bed and the nutrient solution supplies caulocaline.
524. BACHER, T. 635.64: 631.431  
Forsøg med forskellige Vandmængder til Tomater i Væksthus 1937-39. (Experiments on the use of varying amounts of water for greenhouse tomatoes 1937-39.)  
336. Beretning fra Statens Forsøgsvirksomhed i Planteavl, Tidsskr. Planteavl 44: 692-9, from abstract Nord. JordbrForskn. 1940, 22: 274.  
Experiments were conducted by the Danish State Greenhouse Experiment Service (Statens Væksthusforsøg) at Virum during the years 1937-9 in a greenhouse adapted for the purpose. Watering was as follows: (a) 50 mm. per month; (b) 100 mm. per month; (c) 150 mm. per month. Four joint plots were used with 40 plants per plot, which as a rule were watered 5 times a month with 10, 20 and 30 mm. water respectively. Judging was carried out by weighing and sorting the fruits in three picking periods. The results show that earliness is retarded by large quantities of water, the yield in the first picking period being 20% larger for the smallest than for the largest quantities of water; in the second picking period the yield rises with an increasing amount of water, while in the third period it rises only slightly for the larger quantities of water. The experiments show that tomato plants should be planted in suitably damp soil and should not be watered until the fruits begin to grow well; only a small quantity of water should be given at first. When the fruit harvest really begins, watering should be more liberal to increase both yield and size of fruits.
525. SAMPSON, R. W., AND IMLE, E. P. 635.64: 632.8  
A ring spot type of virus disease of tomato.  
*Phytopathology*, 1942, 32: 1037-47, bibl. 15.  
A ring spot virus disease of tomatoes occurring in outdoor tomatoes throughout Indiana is studied. Symptoms differ from those of tobacco ring spot, potato ring spot and ring mosaic viruses. The symptoms are suggestive of spotted wilt but the disease has a more restricted host range and a higher thermal death point. Tomato plants affected with tomato ring spot were not protected against infection by spotted wilt virus.
526. BLOOD, H. L. 635.64: 631.531: 632.3  
Tomato bacterial canker control.  
*Mimeogr. U.S. Dep. Agric. Ext. Serv.* 1375, 1942, pp. 3.  
Clean seed may be obtained from fields infected by *Phytomonas michiganense* by roguing all infected tomato plants before harvest and then extracting the seed by fermenting the crushed fruit pulp for 96 hours before extraction or by treating the seed with an 0.8% solution of acetic acid for 24 hours immediately after the usual extraction. Rigid procedures are enjoined for these methods and are fully described. Even though clean seed is used it is necessary that the seed beds and fields should also be free from infection.
527. SMALL, T. 635.64: 632.4  
Stem rot on outdoor tomatoes.  
*Agriculture*, 1943, 50: 64-7.  
Coincident with the extension of tomato growing in the open there has been an increase of stem rot, *Didymella lycopersici*, which though annually causing severe loss in Jersey is rare in England. Primary attacks develop on the stem at soil level in the form of black or brown areas containing cracks and numerous black pimples. The plant wilts and dies very suddenly. Secondary attacks develop later in the season on most of the aerial parts including the fruit. The fruit is usually infected at the stem end beneath the calyx and falls from the plant. The first attacks usually begin when 3 or 4 trusses of ripening fruit are present, that is, when almost all expenses have been incurred. Regular sprayings with bordeaux or burgundy mixtures fail to check the disease and definite control measures cannot yet be stated beyond the usual sterilization of propagating soil and the use of clean boxes and pots and immediate removal of diseased plants. A water bath should not be used to soak young plants before transplanting. Where the disease appears to attack the leaves first, as it frequently does, the removal of yellowing or attacked leaves will save many plants.
528. GILES, W. F. 635.65  
Interesting types of beans.  
*J. roy. hort. Soc.*, 1943, 68: 73-82.  
Much useful and unusual information is here assembled on the origins and uses of the various types of garden bean. Bean nomenclature is confused and it is often difficult to know to what particular type a writer may be referring, especially as regards French or American kinds, e.g. haricots beurrés are not what is known in England as butter beans nor are they haricot beans in the restricted English sense, while the name pea-bean is now applied to two distinct types, neither, of course, having any connexion with peas. All this and more is now straightened out and writers of popular gardening articles possessing an urge for accuracy should be grateful. Readers of this contribution can be assured that they will learn a great deal about beans that is far from common knowledge.
529. MURPHY, D. M. 635.65  
Bean improvement and bean diseases in Idaho.  
*Bull. Idaho agric. Exp. Stat.* 238, 1940, pp. 22, bibl. 17.  
Great Northern bean selections resistant to the virus of common bean mosaic and Great Northern and Red Mexican hybrid selections resistant to curly top and common bean-mosaic are now in production in Idaho.
530. WILSON, G. F. 635.65: 632.753  
The bean aphid and its control.  
*J. roy. hort. Soc.*, 1943, 68: 49-52, bibl. 5.  
The bean aphid or black fly (*Aphis fabae*) has a wide range of host plants but is best known for its attacks on garden beans, especially broad beans. The aphid overwinters in the egg stage on *Euonymus* species and on *Viburnum opulus*, the guelder rose. Control measures on winter hosts may take

the form of spraying deciduous *Euonymus*, etc., with tar oil wash, 5% concentration. In spring the winter hosts should be dusted with nicotine or sprayed with nicotine and soap wash or with pyrethrum with special attention to the buds and undersides of the leaves. Control measures on summer hosts are to apply nicotine dust by means of a hand dusting machine during the hottest part of the day or a forceful spray of nicotine soap wash or pyrethrin extract, particularly into the tops of the plants and undersides of the leaves. A single application is insufficient. The common practice of pinching out the tops of broad beans will not prevent an attack.

531. HUCKETT, H. C. 635.653: 632.76  
Spraying and dusting experiments with bush Lima beans on Long Island for control of Mexican bean beetle (*Epilachma varivestis*).  
*Bull. N.Y. St. agric. Exp. Stat.* 702, 1942, pp. 45, bibl. 17.

Copper sprays were superior to sulphur sprays for foliage protection of lima beans. Yields from copper treatments were only really satisfactory in 2 out of the 5 seasons in which the trials were carried out. Pyrethrum or rotenone-bearing powder added to copper sprays served to increase their effectiveness in foliage protection slightly but did not always lead to higher yields than those from copper treatments alone. Sulphur sprays were considerably improved as regards foliage protection and yield by the addition of rotenone-bearing powder. Dusting tended to be less effective than spraying.

532. CARTTER, J. L. 635.655: 631.531  
Equipment for maintaining controlled temperature and low humidity in a seed storage-room.  
*J. Amer. Soc. Agron.*, 1942, 34: 1017-26.

In investigations undertaken by the U.S. Regional Soybean Industrial Products Laboratory, which required chemical analysis of many samples of soybeans, it was essential to provide storage at automatically maintained temperature

and humidity. Both had to be reduced in order to keep at a safe minimum enzymatic changes and growths of thermophilic seedcoat moulds. Such low humidity storage would be of value to plant breeders in order to preserve the viability of seed stocks over an extended period. The equipment of the storage room, refrigerating compressor and controls, coil and blower, dampers and unitheaters are described with the help of photographs and diagrams. A unique feature of the equipment is the provision for rapidly and automatically defrosting the cooling coil and pressurestat in the blower control circuit.

533. SHARVELLE, E. G., YOUNG, H. C., Jr., AND SHEMA, B. F. 635.656: 631.531.17  
The value of Spergon as a seed protectant for ~~growing~~ peas.  
*Phytopathology*, 1942, 32: 944-52, bibl. 2.

Seed treatment with Spergon (tetrachloro-para-benzoquinone) of canning peas in Minnesota subject to root rots resulted in 1940 in an average increase in stand amounting to 23% and in yield of 18% over controls. New Improved Ceresan in one case gave the same increase in stand and nitrogen inoculation gave a 10% increase over the untreated control plots.

534. CALDER, R. A. 635.656  
Field peas. The development and performance of a new blue and a new white field pea.  
*N.Z. J. Agric.*, 1942, 65: 347-9.

Two new and improved varieties of field pea have been produced at the Plant Research Station, Palmerston North, N.Z., namely Mammoth Blue (Harrison's Glory × Blue Prussian) and White Prolific (Blue Prussian × Greenfeast).

535. DROBKOV, A. A. 635.656: 546.65  
Influence of cerium, lanthanum and samarium on development of peas.  
*C.R. Acad. Sci. U.R.S.S.*, 1941, 32: 669-70, bibl. 2.

Pea growth was increased by the addition of the rare earths to Hellriegel solution plus boron and manganese.

## FLOWER GROWING.

536. LAWRENCE, W. J. C. 612.014.44  
Photoperiodism in *Streptocarpus*.  
*Gdnrs' Chron.*, 1943, 113: 156.

*Streptocarpus nobilis*, a caulescent species from Nigeria, when sown at the John Innes Institution in December grew no more than 1½ in. high, produced only 1 leaf and some half-dozen cleistogamous flowers. Seeds saved from these plants and sown in May grew to 30 in. and bore scores of deep purple flowers. Subsequent tests showed that for full development this plant needed a day-length of at least 11 hours. The author wonders whether some British annual weeds may not behave in similar fashion when grown under glass in the short days of winter. Some casual observations of the behaviour of goosefoot in weedy seed boxes during winter lend support to the suggestion.

537. FLEMION, F. 635.976.33: 631.531.17  
Effect of the addition of nitrogen upon germination of seeds of *Symphoricarpos racemosus*.  
*Contr. Boyce Thompson Inst.*, 1942, 12: 485-9, bibl. 2.

Seeds of *Symphoricarpos racemosus*, snowberry, will not germinate unless the seed coats have been partially destroyed prior to a period at low temperature to after-ripen the dormant embryo. This occurs when the seeds are kept in moist peat moss at 25° C. for 3 or 4 months. The addition of nitrogen compounds to the peat moss during the period at 25° C. increases the percentage of germination. A possible explanation is the accelerated breakdown of the constituents of the seed coat. The nitrogen might also have an effect on the endosperm or the embryo.

538. TOMEIO (IBARRA), H. P. 635.976: 636.5  
Valor bromatológico de los frutos de *Ligustrum*. (Privet berries as poultry food.) (English summary 11 l.)  
Reprinted from *Rev. Asoc. Ing. agrón. Uruguay*, No. 2, 1942, pp. 3, bibl. 3.

Berries of the common privet, *Ligustrum japonicum*, make a good poultry feed. Their starch content is 57.99%.

539. DOUCETTE, C. F. 635.944: 632.6/7  
Variations in tolerance of narcissus bulbs to hot water-formalin treatment associated with locality of production or of storage.  
*J. econ. Ent.*, 1942, 35: 403-5.

Narcissus bulbs stored at several localities, when subjected to identical hot-water treatment, varied considerably in their response, exhibiting decreased tolerance as the locality shifted from south to north. Locality of production caused no variation.

540. BLANTON, F. S., AND HAASIS, F. A. 635.944: 632.8  
Insect transmission of the virus causing narcissus mosaic.  
*J. agric. Res.*, 1942, 65: 413-9, bibl. 14.

Experiments in U.S.A. with 15 species of insects and 2 mites, to determine whether any were capable of transmitting narcissus mosaic virus, gave positive results for the 7 species of aphids used and negative results for the mites, leafhoppers, thrips and one species of springtail which comprised the rest.



541. DAVIES, H. J., AND FORDHAM, R. D. 635.937.34  
Hints for the cultivation of roses.  
*Bull. U.P. Dep. Agric.* 69, 1942, pp. 13, 2 annas.  
With special reference to the United Provinces,  
Punjab and Bengal.

- YARNELL, S. H. 635.937.9  
Adaptability studies with bearded iris in Texas.  
*Bull. Tex. agric. Exp. Stat.* 615, 1942, pp. 33,  
bibl. 11.

## CITRUS AND SUB-TROPICALS.

542. ALLAN, R. G. 634.3  
Citrus cultivation.  
*Bull. U.P. Dep. Agric. Fruit Ser.* 6, 1942, pp. 26,  
7 annas.

An account of the methods of commercial citrus cultivation best suited to conditions of the United Provinces, India. A note is given of the most suitable rootstocks for the different varieties with some mention of performance. Although an English translation of the vernacular name of the stock is usually provided, the identification is not always made clearer thereby to readers without local knowledge.

543. MOREIRA, S. 634.8-1.541.11  
Experiências de cavalos para citrus I. (Citrus rootstock trials.) (English summary 1 p.)  
*Bragantia*, 1941, 1: 525-65, bibl. 26.

The first results are presented of an extensive study on stock/scion relations in citrus in progress since 1933 at the Limeira Experiment Station, São Paulo, Brazil. The scions used were Baiianinha (a variety derived from Washington Navel), Pera (a Valencia type) and Marsh Seedless grapefruit. Twelve stocks were employed, namely sour, bitter-sweet and 2 types of sweet orange (caipira and lima), tangerine, Rangpur and (Persian) sweet lime, rough and ponderosa lemon, Triumph grapefruit, citron and trifoliata. The stocks were seedlings, each type from one naturally-pollinated parent. Each stock type is briefly described and data are tabulated referring to number of seeds per fruit, germination, polyembryony percentages in most cases, classification according to size and mean height after 6 months and 2 years. The latest nursery measurements showed considerable differences in rate of development between the various stock types. In the nursery the quickest growing stocks were sweet Rangpur and ponderosa limes and citron; the slowest were trifoliata, the two sweet oranges and tangerine. The many observations recorded were made in the nursery but a detailed description and illustrations of the final layout of the experiment are given. The photographs showing the root development of the various stocks under different scion varieties are worth studying.

544. BRIEGER, F. G., MOREIRA, S., AND LEME, Z. 634.31  
Estudo sobre o melhoramento da laranja Bafa III.\* (A study bearing on the improvement of Washington Navel orange.) [English summary 2 pp.]  
*Bragantia*, 1941, 1: 567-610, bibl. 12.

The investigations recorded represent the final report on the stability of a selected clone of Washington Navel. The origin of this clone is mentioned. The buds to form the trial trees were on seedling orange stock. Considerable heterogeneity of fruit was found between the trial trees and also between fruits of the same tree. The differences between trees could be attributed to stock influences. The differences within the tree proved difficult to explain, though it was noted that the larger fruits tended to be on young strong shoots, at least when these shoots formed the upper part of the tree, which was the only time they could be recorded separately. Three types based on fruit size have now been separated from this one clone and named respectively Bafa (i.e. normal Washington Navel) var. Piracicaba

and var. Araras. Under present export conditions var. Araras would have the higher commercial value, since it produces only a small percentage of large unexportable fruit compared with the two other types. It should prove of great economic value if established. The statistical methods employed are explained at some length in the summary.

545. FORD, E. S. 634.334:581.4  
Anatomy and histology of the Eureka lemon.  
*Bor. Gaz.*, 1942, 104: 288-305, bibl. 65.

546. FENNAH, R. G. 634.337-1.541.11  
Observations on the experimental performance of three stocks for W.I. lime in Montserrat.  
*Trop. Agriculture, Trin.*, 1942, 19: 131-2.

Under adverse conditions in Montserrat, B.W.I. (drought, wind, weevils, and scale) rough lemon was proved superior to sour orange as a stock for West Indian lime. The control consisted of West Indian lime grown from seed. Sweet orange was not significantly superior to sour orange nor significantly inferior to the other two. Wild grapefruit, a very promising stock for lime, has not been compared with rough lemon under these conditions.

547. VANSSELL, G. H., AND WATKINS, W. G. 634.31:581.162.3  
Orange nectar and pollen in relation to bee activity.  
*J. econ. Ent.*, 1942, 35: 321-3, bibl. 2.

Data were obtained on the number of blossoms on individual orange trees in S. California. About half the trees in an orchard would be in heavy bloom the same year and there is probably always enough bloom to give a honey crop in each year. The orange blossom produces nectar copiously from a collarlike ring of glands around the base of the ovary. Individual blossoms last 1 week but there is a constant succession which extends the time of nectar production in commercial quantities to 3 weeks, and the off season flowers contribute a small supply over a long season. The orange blossom secretes nectar before the flowers unfold and for 48 hours afterwards. The sugar concentration of the bud nectar ranged between 13% and 17%, in open blossoms it averaged 20.3% and in old shattering blossoms 30.8%. It was greatly increased by low atmospheric humidity. The bees are most attracted by the blooms with the higher sugar concentrations, hence they are more active during periods of low humidity. The Valencia orange produces pollen but the Navel does not.

548. SHAMEL, A. D., AND POMEROY, C. S. 634.31-1.542  
Pruning old Washington navels cuts yields.  
*Calif. Citrogr.*, 1943, 28: 102.

The pruning of old Washington Navel orange trees tended to reduce yields per tree for the year of pruning with no increase in fruit size or improvement in quality. The second and third years' yields were no higher than on unpruned trees. Thus by the omission of pruning labour expenses will be saved and the reduction in yield the first year following pruning will be avoided. The observations were made in the Riverside district of California.

549. JOHNSTON, J. C. 634.3-2.111  
Winter protection for young citrus trees.  
*Calif. Citrogr.*, 1943, 28: 59.

Twelve methods of protecting individual citrus trees from cold are shown photographically. The good and bad points

\* For I and II see *Jornal de Agronomia* 1938, 1: 359-96 and *ibidem* 1939, 2: 161-82 (*Plant Breed. Abstr.* 10: 221).

of these coverings are explained. The most practical method is to cover the trunk and main limbs with cornstalks or similar material, leaving most of the leaves exposed. The butts of the stalks must rest on the ground and the erect stems are then tied close round the trunk to prevent free air movement. As the trees will remain wet for some time after rains a protective wash of zinc-copper-lime or bordeaux mixture should be applied to the trunk before wrapping down to the first lateral roots, the soil being pulled away for the purpose. Canopies are not good protection because they shade the leaves excessively; paper and sacking are especially to be avoided.

550. OLLIVIER, A. V. 634.3-2.111

Efectos de las heladas invernales sobre las plantas cítricas. (Winter injury of citrus.)

Rev. B.A.P., 1943, 26: 302-9, 11, 13, 15-6.

An account is given of winter injury in orange and lemon groves in Argentina. In lemons the shoot tips appeared as if scorched. Large fruits developed a large white lesion covering the greater part of the side exposed to the sun and the fruit dropped or rotted on the tree. Fruit less injured developed in 8-10 days the reddish spots so often associated with cold injury. The spots were the size of a lentil and the fruit pulp was dry. Fruit in the interior of the tree showed no visible sign of damage at first but in 5 days time the skin took on a reddish-yellow tinge, the fruit felt soft when pressed in the hand and transverse opening revealed a number of dry sections and injured cells. Small green or recently set lemons looked as if burnt and were the most susceptible to injury. Larger green lemons lost their juice. During the first 15-20 days the injured twigs and sometimes large branches dried up and splitting of the bark of the trunk was usually, though not always, followed by the death of the tree. Sometimes complete defoliation occurred. Trees worked on trifoliolate were less injured than those on sweet or sour orange. Trees bearing fruit at the time of the frost suffered more than those which for any reason were not in fruit. An interesting observation was that frosted trees which retained their withered leaves usually dried up in early spring whereas frosted trees which shed their foliage, fortunately in the majority, would shoot afresh at that season. Oranges showed much less injury and that chiefly in the form of withered shoot tips. Some leaves acquired a silvery tint and a few branches dried up. Fruits did not appear to be affected but after 15 days a few fell. Later there was some discoloration and softening. On opening fruits so affected were found to be juicy but slightly bitter. Damaged trees quickly recovered. After a frost it is important that all fruit be at once removed from an injured tree. When spring arrives, but not before, the injured wood should be cut out, the soil cleaned out from the base of the tree and a thorough spraying given with bordeaux, the trunks being painted with bordeaux paste. The trees must be closely watched throughout the season for signs of disease. Any suckers appearing below the graft union must be removed.

551. KLOTZ, L. J., AND SOKOLOFF, V. P.

581.144.2: 634.3 + 634.653

The possible relation of injury and death of small roots to decline and collapse of citrus and avocado.

Calif. Citrogr., 1943, 28: 86-7, bibl. 8.

Decline, or gradual dieback and collapse, or sudden wilting followed by death, of citrus and avocado are invariably associated with a dearth of healthy feeder roots and often by the presence of many injured and dead ones. Root infection of *Phytophthora* spp. is usually present. Experiments here described and carried out at Riverside Citrus Experiment Station in 1940 suggest that the importance of fungus infection in decline and collapse is conditioned by other factors, in particular by toxic nitrites produced from reduction of nitrates by chemical and biological agents. *P. parasitica* and *P. cinnamomi* are active denitrifiers though

unable to use the nitrate ion as food. It is pointed out, however, that a number of substances other than nitrite, such as hydrogen sulphide, hyponitrite and hydroxylamine may act as respiratory poisons. Nitrite injury may occur on well drained, light textured soils no less than on heavier soils. It has possibly often escaped recognition because the symptoms may occur after the nitrite has been removed from the soil, for instance by reduction with ferrous iron, by the formation of additional compounds with organic materials or by leaching. Investigations are now proceeding to determine cultural conditions tending to the production of nitrite and whether injections of suitable chemicals into the root zone would prevent the accumulation of nitrite and other respiratory poisons.

552. LOEST, F. C.

634.3-2.4

Diplodia and brown-rot gummosis of citrus.

Fng. S. Afr., 1942, 17: 517-20, 523.

A comparison of the symptoms of the 2 citrus diseases *Diplodia gummosis* (*D. natalensis*) and brown-rot gummosis (*Phytophthora citrophthora*) is tabulated and the contributing conditions in faulty orchard practice are listed with suggestions for their avoidance. Control of *Diplodia*, after every possible preventive measure has been tried, is obtained by cutting out every diseased limb and in the case of lesions on the trunks by removing the injured bark and wood, cutting in all cases well beyond the visibly infected areas. The cut surfaces must be painted with a disinfectant such as 1 teaspoonful potassium permanganate to 1 pint of water and later with a good covering preparation. This fungus is very resistant to bordeaux and certain other fungicides. Control of brown-rot gummosis. The dead or infected areas of tree and branch are scraped or gouged out and disinfected with a suitable fungicide. An alternative method is to inject under pressure into the trunk just above the lesion about 200 c.c. of a solution of methylene blue (1.5 grams refined methylene blue in 1,000 c.c. water). The injection is made by means of a blow lamp of 1 litre capacity especially fitted for the purpose. Details of this lamp and its use can be obtained from the sub-tropical Horticultural Research Station, Nelspruit, South Africa. Failures have been experienced but early treatment usually succeeds.

553. CARVALHO, R. DE S.

634.3-2.654.1

Sobre a ocorrência de um nematode nas raízes das plantas cítricas. (The occurrence of a nematode in citrus roots.)

Rev. Agric. S. Paulo, 1942, 17: 347-52.

A nematode attacking citrus tree roots in Brazil was obtained from several sources and was identified as *Tylenchulus semipenetrans* Cobb. A heavy attack can do considerable harm to the tree, causing, for instance, sub-normal growth, leaf chlorosis and die-back.

554. GUNTHER, F. A., AND EBELING, W. 632.951.8

The determination of kerosene oil deposit on citrus leaves.

J. econ. Ent., 1942, 35: 333-9, bibl. 10.

Hitherto no adequate dependable method for determining the total amount of an oil deposited on any portion of a tree, including that which has penetrated into the plant tissue, has been proposed. The authors have now standardized and here describe a method involving the selective chemical disintegration of the leaf cells, accompanied by a steam distillation of the stable oils present which has proved to be rapid, accurate, reproducible and easily applied to the determination of kerosene deposits regardless of the extent to which penetration has taken place.

555. BOYCE, A. M., PERSING, C. O., AND BARNHART, C. S. 634.3-2.73

The resistance of citrus thrips to tartar emetic-sucrose treatment.

J. econ. Ent., 1942, 35: 790-1, bibl. 3.

Great differences in resistance between citrus thrips, *Scirtothrips citri*, from 2 different districts to tartar emetic-sucrose



sprays suggest the recent development of a new resistant biological race.

556. COX, J. A. 632.752: 634.3

Effect of dormant sprays on parasites of the San Jose and terrapin scales.

*J. econ. Ent.*, 1942, 35: 698-701, bibl. 3.

Present spray practices have a tendency to reduce the parasites of scale in citrus orchards.

557. HOLLOWAY, J. K., HENDERSON, C. F., AND MCBURNIE, H. V. 634.3-2.752

Influence of tartar emetic on the yellow scale and its parasite, *Comperiella bifasciata* (How.).

*J. econ. Ent.*, 1942, 35: 346-7, bibl. 2.

Tartar emetic as used for the control of citrus thrips, *Scirtothrips citri*, in California, had no effect on yellow scale, *Aonidiella citrina*, or its parasite, *Comperiella bifasciata*.

558. YUST, H. R., AND BUSBEY, R. L. 634.3-2.752

A comparison of the susceptibility of the so-called resistant and non-resistant strains of California red scale to methyl bromide.

*J. econ. Ent.*, 1942, 35: 343-5, bibl. 4.

The strains of California red scale, *Aonidiella aurantii*, resistant and non-resistant in the mature female stage to hydrocyanic acid, showed the same characteristic in the case of methyl bromide but the difference in susceptibility between the two strains was less. In the early, grey adult, stage the resistant strain was more susceptible to methyl bromide than the non-resistant strain in 40-minute fumigations but not in 120- to 180-minute fumigations. In the second moult stage there was no difference in susceptibility to methyl bromide between the two strains.

559. LINDGREN, D. L., AND DICKSON, R. C. 634.3-2.752

Fumigation experiments on black scale.

*Calif. Citrogr.*, 1943, 28: 90, 98-9, bibl. 4.

At Riverside Citrus Experiment Station no differences in kill of citrus black scale eggs by HCN fumigation were observed between eggs under the mother scale and in laboratory dishes, between eggs just laid and those ready to hatch or between eggs from resistant and from non-resistant black scales. Non-resistant black scale were easy to kill until they reached the "rubber" stage when they became more difficult. Differences in tolerance to HCN fumigation seem to be greater between resistant and non-resistant black scale than between the two strains of the California red scale. Black scale preconditioned at 50° F. and 90° F. showed slightly higher survival than those preconditioned at 75° F. but were generally less affected by preconditioning temperatures than red scale. Preliminary protective stupefaction could not be demonstrated, in fact the stupefying charge seems to have slightly increased the kill.

560. SINCLAIR, W. B., AND LINDGREN, D. L. 634.3: 632.944

Ridges and sectors induced in the rind of citrus fruits by fumigation with hydrocyanic acid.

*Plant Physiol.*, 1943, 18: 99-106, bibl. 4.

At Riverside Citrus Experiment Station, California, the fumigation of citrus trees with HCN when the fruit was in a certain state of bud development resulted in the formation of sectors and ridges in the outer peel of the fruits of Valencia and Navel orange, grapefruit and lemon. Fumigation in February produced the greatest amount of deformation but with lemons severe effects were produced in trees fumigated between late January and the end of April. The reasons for this injury are obscure but may be due to some genetic change caused by HCN such as the doubling of chromosome numbers. Climate and seasonal changes do not appear to be involved except in so far as they affect the time at which bud development will be passing through the sensitive stage.

There is no correlation between ridging and size of fruit and the interior of ridged fruit is quite normal.

561. HOLLOWAY, J. K., HENDERSON, C. F., AND MCBURNIE, H. V. 634.3-2.654.2

Population increase of citrus red mite associated with the use of sprays containing inert granular residues.

*J. econ. Ent.*, 1942, 35: 348-50.

The use of sprays containing zinc caused a significant increase in citrus red mite populations (*Paratetranychus citri*) in California for reasons that could not be determined but which could be associated with some physical or chemical property of the spray rather than with the quantity of inert material used, 6-19 lb. of residue per 100 gal. water.

562. YUST, H. R., NELSON, H. D., AND BUSBEY, R. L. 634.3-2.752

The stupefaction of California red scale with sublethal dosages of hydrocyanic acid.

*J. econ. Ent.*, 1942, 35: 339-42, bibl. 4.

THOMPSON, W. L. 634.3-2.752: 631.454

The effect of magnesium deficiency on infestations of purple scale on citrus.

*J. econ. Ent.*, 1942, 35: 351-4, bibl. 6.

MCGREGOR, E. A. 634.3-2.654.2-2.752

Sulfur dust as a supplement to cyanide fumigation for control of black scale and its effect on citrus red mite.

*J. econ. Ent.*, 1942, 35: 355-8, bibl. 2.

YUST, H. R., BUSBEY, R. L., AND HOWARD, L. B. 632.752

Laboratory fumigations of the California red scale with methyl bromide, alone and with hydrocyanic acid.

*J. econ. Ent.*, 1942, 35: 521-4, bibl. 7.

FLANDERS, S. E. 632.752: 632.96: 632.796

The Argentine ant versus the parasites of the black scale.

*Calif. Citrogr.*, 1943, 28: 117, 128, 137, bibl. 18.

BUSBEY, R. L., AND FULTON, R. A. 634.3-2.951

Spray residues of tartar emetic on citrus leaves. Determination by iodometric titration.

*Industr. Engng Chem. (Analytical Edition)*, 1943, 15: 37-8, bibl. 2.

563. LEWIS, H. C., AND LA FOLLETE, J. R. 634.3-2.64

Control of the brown snail in citrus orchards.

*J. econ. Ent.*, 1942, 35: 359-62, bibl. 5.

In Californian citrus orchards arsenical baits are more effective than metaldehyde baits for the control of brown snails. Metaldehyde baits are most effective when placed in piles in the sunshine. The best season for control is in late winter and spring when the snails are most active. Arsenical baits are most effective when broadcast on the trees, especially when greatest tree damage is being done by immature snails. The most effective bait tried was fresh pressed orange pulp with calcium arsenate.

564. LEWIS, H. C. 632.64

Snail control should be applied when snails are active.

*Calif. Citrogr.*, 1943, 28: 116.

The usual methods of baiting for control of snails in citrus are briefly described [see *H.A.*, 12: 568]. A new and successful method of control by spraying with tartar emetic 2 lb., sugar 4 lb., water 100 gal. is described. The spray is applied with multiple nozzle fog spray guns at the rate of 3 to 4 gal. per average tree. A 60% to 70% kill of mature snails and a 90% kill of immature snails at a cost of 5 to 7 dollars per acre is reported for a single application.

565. BLACKMON, G. H. 633.85  
The tung oil industry.  
*Bot. Rev.*, 1943, 9: 1-40, bibl. 143.  
The tung tree, *Aleurites fordii*, was introduced into the U.S.A. from China in 1905 and there were by 1940 over 4 million trees of bearing and  $8\frac{1}{2}$  million trees of non-bearing age, all in the southern states. The 1940 U.S.A. production was 4 million pounds of refined oil. Tung grows best on well-drained loamy soils preferably with a legume cover crop. Commercial fertilizers are used and should contain about 5%, 7% and 5% respectively of N, P and K. The seed hulls and cake after oil expression are also returned to the land. Cultivation consists of a twice yearly disking. The trees seem to suffer cold injury only when temperatures fall to freezing after growth has started. There are various deficiency disorders; zinc deficiency causes bronzing, manganese a typical chlorosis known as frenching, and iron deficiency chlorosis showing a definite leaf pattern. Propagation is by seed from selected high yielders with high oil content. There is some planting of budded trees. One of the difficulties in patch budding, the most successful method, is that of forcing some of the buds into growth after a successful take. This is attributed to stock influence, since it is known that some parent trees produce seedling stocks which will grow a bud to better advantage than will others. The need for vegetative propagation has not been felt because a large percentage of seedling trees from selected trees reproduce the high yielding characters of their parent; they often give a considerably higher yield per tree than buds from the same parent and are rather more vigorous. The fruit is harvested after it has fallen and the oil expressed by pressure. The percentage of oil in the whole fruit averages for milling purposes 16%. The average oil in the seed is 33%. American oil is of high quality, being of light amber or light golden colour.
566. McCANN, L. P. 633.85: 581.145  
Development of the pistillate flower and structure of the fruit of tung (*Aleurites fordii*).  
*J. agric. Res.*, 1942, 65: 361-78, bibl. 29.
567. SELLSCHOP, J. 634.58  
Groundnut production.  
*Fmg. S. Afr.*, 1942, 17: 651-4, 670.  
How to produce groundnuts profitably under S. African conditions. Suitable districts are recommended. While large crops of groundnuts can be produced on the heavier soils there are difficulties in cultivating and lifting. Light friable loams well supplied with organic manure and containing some lime are best. To secure even stands the seed nuts should be sized and disinfected with mercuric dust. Medium sized seeds are preferable to large and only shelled seed should be planted. A suitable spacing is 5 to 7 inches apart in rows 30 inches apart, and planting depth 2-3 $\frac{1}{2}$  inches. On poor soils groundnuts respond to yard manure with superphosphate added, the superphosphate being kept from contact with the seeds in the drill. Cultivation is undertaken as soon as the plants are well above ground. Harvesting begins when the kernels are loose and the shells brown on the inside. The hay after removal of the nuts is rich in protein and should be stored. Virginia Bunch is the most widely grown variety because of earliness, size of nut and ease of picking and shelling. The nut-rot fungus, *Sclerotium rolfsii*, is often troublesome, rotting maturing nuts from the plants. It can be kept in check by deep ploughing of all stubble and by crop rotation.
568. MATHEZ, F., AND BLISS, D. E. 634.62-1.55: 581.144.4  
The relation of leaf area to alternate bearing in the Deglet Noor date palm.  
*A.R. Date Growers' Inst.* 19, 1942, pp. 3-7.  
The incidence of alternate bearing in Deglet Noor palms is related to the ratio between the number of fruits and the green-leaf area of the palm. The data indicate that a healthy Deglet Noor palm having 104 to 115 mature green leaves with an average area of 47.1 sq. ft. at the time of fruit-thinning, is capable of bearing 125 fruits per leaf without danger of alternate bearing; a palm with 91 to 103 leaves (44.3 sq. ft. average area) is capable of bearing 118 fruits per leaf; and a palm with 78 to 90 leaves (42.9 sq. ft. average area) is capable of bearing 100 fruits per leaf. A quick and accurate method for counting the leaves on a Deglet Noor date palm is described. The importance of retaining a sufficient number of green leaves on a bearing palm is stressed. D.E.B.
569. SINCLAIR, W. B., BARTHOLOMEW, E. T., AND BLISS, D. E. 634.62  
A comparison of the commercial grades of Deglet Noor dates.  
*A.R. Date Growers' Inst.* 19, 1942, pp. 13-8.  
This investigation was carried out to determine certain chemical and physical differences in the commercial grades of Deglet Noor dates in California. Grading in the packing house is done on the physical appearance of the fruit. Although the fruit from five different gardens varied in regard to distribution in the commercial grades, the percentages of total sugars of the different grade samples from the same garden and from different gardens were remarkably uniform. The average fresh weight of the fruit of the different grades from a given garden showed a slight tendency to decrease with the decrease in quality of the fruit as indicated by the grades. While the commercial grading of dates is based principally on the physical characteristics and general appearance of the fruit, moisture content appears to be the most important chemical property involved in fruit quality. W.B.S.
570. REECE, P. C. 634.653: 581.145.1  
Differentiation of avocado blossom buds in Florida.  
*Bot. Gaz.*, 1942, 104: 323-8, bibl. 1.  
At the Subtropical Field Station, Orlando, Florida, avocado buds of Wula and Nabal collected at Orlando and Homestead were studied. Differentiation began with the development of the second proximal axes in late October or November. The first identifiable flowers appeared in January buds of both varieties at Orlando and of Lula at Homestead, but in Nabal at Homestead they had not appeared on 10 March. Differentiation proceeded distally during the winter and in the most distal secondary axes it was completed just prior to the expansion of the bud. Development into bloom was not interrupted by a dormant period between the time of initiation and differentiation on the inflorescence and its expansion in the spring.
571. SYDENHAM, F. 634.74  
Tree-tomato culture.  
*N.Z. J. Agric.*, 1943, 66: 93-4.  
The tree-tomato, *Cyphomandra betacea*, Solanaceae, is a sub-tropical fruiting shrub native of Brazil. The fruit is useful in salads or may be cooked and to avoid a bitter flavour should be peeled before eating. The skin comes away easily if the fruit is dropped into boiling water. There are two types of fruit, an early maturing yellow and a later maturing red, both keeping well for several months without withering, if stored away from draughts. Propagation is by seed or cuttings. The latter produce low branching plants, a habit of growth which impedes cultivation. Seed-grown plants bear one main stem. Plantations, preferably in a sheltered position, should be laid out with plants 3 ft. apart in rows 15 ft. apart. Windy sites must be planted more closely. Good drainage is essential. Manure may be given when the fruiting stage is reached. A suggested application at the peak period in the 5th or 6th year is 2 parts superphosphate, 1 $\frac{1}{2}$  parts nitrate of soda, 1 part sulphate of potash applied in late winter or early spring at the rate of 2 to 3 lb. per plant. Growth is very vigorous and green manuring is only possible in the early years before



the foliage completely shades the ground. Seedlings should be stopped at 3 ft. or 4 ft. to encourage branching. Cuttings will not need this attention. Established plantations need heavy pruning after the crop is gathered, about the time spring growth begins, the aim being to maintain as large a proportion of young wood as possible. Strong branches appearing low down on the trunk should be retained to take the place of some of the older wood. The only serious disease is mildew, *Erysiphe* sp., which is controlled by spraying with colloidal sulphur (40%) at 3 lb. per 100 gal. water.

## 572. BUREAU DE LA DÉFENSE DES VÉGÉTAUX, MAROC.

632.728

Lutte contre les acridiens. (Locust control.)

*Memento Dir. Prod. agric. Maroc*, 61, 1943, pp. 25.

The following methods, which are found to be the only ones giving satisfactory results, are for the adult insect gathering and crushing, for the eggs ploughing in, for the larvae poisoned bait and mechanical barrages. The construction of the latter are described with illustrations and in considerable detail.

## TROPICAL CROPS.

## 573. AMANI. 551.566.1: 633 + 635

Précis of work of the East African Agricultural Departments on improvement of native food crops carried out in 1941.

*Mimeo. E. Afr. agric. Res. Stat. Amani No. DF/5/2*, 1942, pp. 14.

Reports of work carried out in Amani, N. Rhodesia, Uganda, Kenya, Nyasaland and Zanzibar. Of the crops discussed this Bureau is interested in cassava, sweet potatoes, legumes and oil-bearing plants and vegetables. Considerable attention has been paid to all these and some of the results obtained are reported fairly fully, in particular the successful work in progress in various districts on cassava improvement.

## 574. VENEZUELA. 633/635

Enseñanza. Investigaciones y estudios. (Memorandum on agricultural education and research in Venezuela.)

*Memoria Minist. Agric. Venezuela*, 1941, pp. 107.

The memorandum forms part of a report on the agricultural situation in Venezuela presented to the National Congress in 1941. It gives an account of the schools of agriculture and animal husbandry in the country and of the particular work each is supposed to do and of the work carried out by various agricultural research institutions, with some of the results obtained.

## 575. TUCUMAN. (CROSS, W. E.) 633/635

Notas sobre el progreso de la agricultura y las industrias agropecuarias de Tucuman. (Notes on the progress of agriculture and animal husbandry in the last 60 years in Tucuman.)

*Bol. Estac. exp. Agric. Tucuman* 36, 1942, pp. 75.

An account of the progress made with the various agricultural crops grown during the past 60 years in the Argentine province of Tucuman and more especially of the influence and work of the Tucuman experiment station founded in 1907. Chief attention is given to the development of the sugar industry but many other crops including fruits and vegetables are noticed.

## 576. PARSONS, T. H. 58.006: 551.566.1

Items of interest in the activities of the Royal Botanic Gardens, Peradeniya, in the last quarter of a century.

*Trop. Agriculturist*, 1942, 98: 28-42.

## 577. GRÜNWALD, O. 632.951

La industria del barbasco y sus perspectivas para Venezuela. (Cultivation and prospects of *Lonchocarpus* and *Derris* as commercial crops in Venezuela.)

*Bol. Inst. exp. Agric. Venezuela* 2, 1941, pp. 20, bibl. 28.

Over 40 species or varieties of *Lonchocarpus* are found in Venezuela but little work has been done in determining their rotenone-bearing qualities. There are, however, one or two plantations in which *Lonchocarpus* [presumably *L. nicou* and *L. urucu*] is grown. *Lonchocarpus* requires a

warm and humid climate and some species prefer a well defined rainy season. The most suitable soils are sandy or light sandy argillaceous, well supplied with humus and of a somewhat acid reaction. Propagation is by cuttings 30 cm. in length with 2 or 3 nodes. They are set in the soil at an angle of 45° with one node above ground. In the Philippines old slow-growing wood used for cuttings is specially treated before planting by the removal of a small section of bark to expose the cambium. The latter is then scraped with a toothed knife to impede callusing during root formation and rapid healthy growth is said to result. The cuttings are set at the beginning of the rainy season 1.5 to 2 m. apart in well worked soil. *Lonchocarpus* is found to grow best when interplanted with other crops. The roots between 1 and 4 cm. diameter are usually first harvested at the end of the second year and thereafter once yearly to the fifth year, the method being to uncover and cut off a part without disturbing the remainder. Some research is needed to determine, from the point of view of harvesting, whether the rotenone content of the root undergoes seasonal fluctuations. From 2 to 6 kilos of roots per plant per year is about the range of yield. Notes are given on the cultivation of *Derris* and on the general technique of drying and manufacture of rotenone bearing roots. Results of original analytical work by the author and another showing the rotenone content and other particulars of samples of a number of rotenone bearing plants, not all of them identified, from various parts of Venezuela, are tabulated.

## 578. CLARK, E. P. 632.951

The occurrence of rotenone and related substances in the seeds of the berbera tree (*Milletia ferruginea* Hochst. (A procedure for the separation of deguelin and tephrosin.)

*J. Amer. chem. Soc.*, 1943, 65: 27-9, bibl. 3.

## 579. CROUCHER, H. H. 631.459

Progress in soil erosion control.

*J. Jamaica agric. Soc.*, 1942, 46: 211-3.

Methods of erosion control suitable for Jamaican conditions are suggested. Barrier grasses should be planted along the contours, the vertical distance between barriers should not exceed 4 ft. on gentle and 5 ft. on steeper slopes instead of the 6-8 ft. originally recommended. The digging of small benches and planting grass on the lower side is not a suitable method. Notes are given to assist the choice of grass. The barriers must be carefully and closely planted, well pressed with the foot and mulched. Bare earth will later appear below the barrier; this must be planted up with another row of grass, using the original row as a source of plant material. Gaps in the grass must be immediately replanted or gullies will develop between the stools. Wall barriers can be built but require constant maintenance. Steep slopes usually left uncultivated elsewhere must be used in Jamaica. The most practical method seems to be the use of alternate contour strips of equal width crop and barrier grass or cover crop, the width of each strip not exceeding  $\frac{1}{2}$  chain. Two serious obstacles have been encountered in inducing cultivators to adopt anti-erosion methods. The

first is insecurity of tenure, the second the waste of ground involved by the barrier strips. These, being unfenced, cannot be grazed unless the cattle are tethered.

580. TOFFE, C. R. 631.875

**Compost making without watering.**

*Mon. Bull. Coffee Bd, Kenya, 1942, 7: 104.*

The technique is explained for preparing large quantities of compost simply and cheaply from a single material, Napier grass (*Pennisetum purpureum*) and 28 head of cattle. The material is in the stack for 90 days. The method varies from the principles laid down for the Indore process by the use of succulent immature grass which forms a close pack and no watering instead of mixed bedding which maintains an open texture and wilted green planted material requiring copious watering.

581. MARTYN, E. B. 632.3/8: 633/635

**Diseases of plants in Jamaica.**

*Bull. Jamaica Dep. Sci. Agric. 32, 1942, pp. 36, bibl. 31.*

The types and symptoms of plant disease are first discussed and this is followed by a discussion of control methods. General notes are given of the characteristics of virus, root and collar, leaf spot, fruit rot and anthracnose diseases. Finally the symptoms of particular diseases on the more important individual crops grown in Jamaica are noted. All the 40 crops, the diseases of which are noted, are of horticultural interest.

582. FROMM, F. 632.51

**The eradication of nut grass [*Cyperus rotundus*].**

*Science, 1942, 96: 337-8.*

In experiments conducted in Puerto Rico the application of tillage followed immediately by a 2 N thiocyanate solution at the rate of 1 litre per sq. m. eradicated nutgrass within 90 days when either treatment alone proved ineffective.

583. PADWICK, G. W. 632.952

**Recent advances in control of fungous diseases of plants.**

*Indian Fmg, 1942, 3: 478-81.*

A few instances of control are discussed briefly, such as of root rot disease of rubber, potato blight, gram blight, *Pythium* disease of wheat, cotton root-rot. Breeding and selection of resistant strains, fungicides, dusts and seed dressing are also noticed.

584. CALVERT, J. 633.5

***Urena lobata*—a jute substitute.**

*J. Coun. sci. industr. Res. Aust., 1942, 15: 318-20.*

A report of retting trials with *Urena lobata* received at Canberra from the South Johnstone Research Station, Queensland, showed that the material varied greatly in strength of fibre but that it was comparable with a low-grade jute both as to quality and colour. The relative strength of the twine was higher than that of Indian jute and considerably higher than *Urena* from the Belgian Congo. Recommendations are made with regard to desiccation, retting and washing.

585. TAYLOR, J. E. 633.584.9

**The raphia palm (*Raphia sudanica* A. Chev.).**

*Its propagation and uses in Northern Nigeria.*

*Farm and Forest, 1941, 2: 21-4, bibl. 1.*

*Raphia sudanica*, a palm which has innumerable uses, can be easily established in plantations, especially on moist sites drained by rivers and streams. It is unaffected by complete immersion for short periods. The uses made of the palm leaves and mid-ribs have greatly increased since the war and in many districts dying crafts dependent on *Raphia* for their raw material have been revived. Unfortunately *Raphia* groves are one of the chief haunts of tsetse flies. However, restricting access to the groves to the first

14 days of each quarter ensures that any flies infected by cutters with sleepy sickness trypanosomes during this period would have died off before the next cutting and since it takes 20 days for the trypanosome to become infective within the fly 14 days would provide ample safeguard against infection within the cutting period itself. Propagation is by seed but vegetative propagation is the subject of experiment.

586. VIÉGAS, A. P. 633.682-2.48

**Manchas das folhas da mandioca, produzidas por cercosporas. (Cassava leaf spots caused by *Cercospora henningsii* and *C. caribaea*.)**

*Bragantia, 1941, 1: 233-48, bibls. 48 and 9.*

Described and easily distinguished apart. *Cercospora henningsii* produces dark brown spots which later turn dark ash-grey, while *C. caribaea* spots are pale yellowish white and more numerous. Both are here illustrated in colour. Spraying with 1% bordeaux mixture is suggested as control. A sticker must be included to retain it on the leaves.

587. HOOVER, A. A. 633.685: 581.192

**Analyses of Ceylon foodstuffs. X. The mineral analyses of some local yams and vegetables.**

*Trop. Agriculturist, 1941, 97: 185-87, bibl. 5.*

Yams, which are a popular food with the poorer section of the people in Ceylon, are shown to have no nutritional importance apart from their carbohydrate content. A number of local green vegetables were found to be excellent sources of calcium, iron and vitamins A and C.

588. ROELOFSEN, P. A. 633.71

**Recent research at the Deli Tobacco Experiment Station, Medan, Sumatra.**

*Emp. J. exp. Agric., 1943, 11: 15-22.*

The work of the Deli Tobacco Station, which is concerned exclusively with the growing of cigar wrapper tobacco, is divided among 4 departments. (1) *Agricultural Department*. Its main projects concern manuring, control of slime disease (*Pseudomonas solanacearum*) and modern methods of field experimentation applied to tobacco. (2) *Botanical Department*. The investigations include work on the physiology of nutrition in water cultures. Pathological work has been devoted to virus diseases, slime disease, frog eye disease (*Cercospora nicotianae*) and selection for disease resistance. (3) *Entomological Department*. The chief pests are 4 caterpillars of the Noctuidae, the capsid *Engitatus tenuis* and the aphid *Myzus persicae*. Nematodes (*Heterodera marioni*) can be well controlled in seed beds by fumigation with methallyl-chloride or other substance. *Agrochemical Department*. A soil survey was completed in 1938 and detailed maps were in preparation. Agro-chemical data are being collected for the different soils. This Department also carries out all sorts of analytical work.

589. ROGERS, W. M., AND JOACHIM, A. W. R. 633.71-1.8

**Experiments on the manuring of cigarette tobacco in Ceylon.**

*Trop. Agriculturist, 1941, 97: 264-71, bibl. 1.*

590. EDEN, T. 633.72-1.8

**A note on irregularity in manuring [tea].**

*Tea Quart., 1942, 15: 27-8.*

In view of the uncertainty of delivery of manures for tea plantations in Ceylon certain modifications may be necessary in the graded manurial schedules for tea plantations recommended by the Tea Research Institute. The earliest application is least efficient and can be omitted for first year fields. In the case of fields which have passed their normal date a scheme is worked out for amalgamating two applications in the face of diminished supply.



591. GADD, C. H. 633.72-2.76

The effect of plucking on shot-hole borer attack in tea.

*Tea Quart.*, 1942, 15: 31-40, bibl. 6.

An experiment was carried out by the Tea Research Institute, Ceylon, to test the planting opinion that hard plucking induces a heavier infestation by shothole borer, *Xyleborus forficator*. The plots were on Gonakelle Estate at 3,500 ft. The hard-plucked bushes were the less severely attacked. Attack was most severe during the second year from pruning and almost ceased from factors that developed during the third year. These factors are discussed and are probably connected with physiological changes in the bush itself brought about by hard plucking which make the bush unsuitable for borer attack.

592. RAO, M. K. S. 632.72-1.543.1

The deterioration of grevilles on South Indian tea plantations.

*Plant Chron.*, 1942, 37: 370-4 [part 2 not received], 418-20, bibl. 18.

The value of *Grevillea* as a shade tree for tea is discussed. Though no shade tree yet tried is entirely satisfactory *Grevillea* appears to be the best of them. If mixed shade is used *Grevillea* should always find a place. Instructions are given for the care of the young trees. There appears to be little severe disease and should it occur on any large scale it would be impossible to treat. Unthriftness in the trees can generally be attributed to wind damage, reduction of soil fertility through erosion, climatic conditions which include long wet periods followed by severe droughts, root competition and senescence. Gummosis and branch canker may be contributory causes.

593. GILLET, S. 633.73

Progress report on individual tree recording in Kenya.

*Mon. Bull. Coffee Bd, Kenya*, 1942, 7: 95, 98.

The work of tree recording and selection has been maintained by the Coffee Services of the Kenya Agricultural Department during the war without interruption. Individual records covering 5 years are available for some 3,000 trees scattered throughout the colony. Trees with abnormally high yields have not been found. The best trees averaged 15 cwt. annually per acre over the 5-year period, while a high percentage have given between 7 and 10 cwt. The variability between trees has been very marked, and plantation yield per acre could be much increased if the obviously uneconomic trees were uprooted or topworked. Crop regulation by careful pruning has almost invariably produced each year an economic crop with improved quality and size of bean. Failure to regulate cropping has resulted in overbearing and biennial or even triennial cropping. Sucker growth from apparently outstanding trees has been collected and grafted at the Laboratories though early observation has not always proved correct. The use of mature seedling stocks enabled the recording of grafted trees to begin within two years. The records taken annually of selected trees include yield, size and shape of bean and liquoring quality. By these methods it is hoped that when large-scale planting begins again the Agricultural Department will be in a position to offer material which is a vast improvement on anything that has been obtainable in the past.

594. COTTINGTON, E. 633.73

Progress report on investigations and observations on coffee in the areas west of the Rift [Kenya].

*Mon. Bull. Coffee Bd, Kenya*, 1942, 7: 103, 105.

The altitudes at which the coffee under observation is being grown range from 4,000 to 7,000 ft. Shade is necessary throughout the region especially at the higher altitudes. Shade trees at the higher altitudes are slow growing and often difficult to establish. Notes are given on a number of them.

Selection of high yielding strains is important. A method of regeneration which has proved successful on a small scale is to plant selected seedlings among the old coffee. Yield trials with seedling coffee from high yielding parents are in progress at the Kitale Station. Multiple and single stem pruning are discussed. It is emphasized that in the case of multiple stem pruning the suckers for the new cycle must be started early enough to flower the following year or they will be out of hand by the second year. The Merrett single stem pruning system is being experimentally modified at Kitale with promising results to suit local conditions. *Antestia* is the main pest. Africans trained in *Antestia* control work are available on loan from the Agricultural Department. Suggestions for soil treatment appropriate to the different local soil and climates are made. The reasons for the recent unfavourable reports on western area coffees are discussed. Bad preparation is frequently the cause. In conclusion it is suggested that for this area coffee should not be a one line plantation crop but should form one of the most remunerative lines in mixed farming.

595. MENDES, J. E. T., BRIEGER, F. G., KRUG, C. A., AND CARVALHO, A. 633.73

Melhoramento de *Coffea arabica* L. var. Bourbon. (Improvement of *Coffea arabica* var. Bourbon in São Paulo, Brazil.) [English summary 5 pp.]

*Bragantia*, 1941, 1: 3-176, bibl. 11.

*Chap. I (Mendes)*. The plantation set out in 1931 for observation and selection consisted of 1,107 Bourbon arabica spaced 3 m. apart, a departure for statistical reasons from the usual S. Paulo method of planting from 3 to 5 in a "bed". Great variability among the plants was disclosed, there were poor yielders, biennial bearers, trees which died back from over-production and a number that bore regularly without much variation in annual yield. Several trees were selected for progeny tests.

*Chap. II (Brieger)*. The layout and the statistical problems that arose are discussed. Much heterogeneity was shown, in fact only a few trees could be described as normal. This heterogeneity definitely results from inherent individual variation rather than environment. Three main types appeared, namely, two sets of biennial bearers operating in years alternate to each other and a third type which showed a steadily increasing yield annually. These types were again empirically divided into subtypes, (1) strong and (2) weak for the biennial bearers and (1) decreasing or (2) increasing and stable yielders after 1939 for type 3. The final selection of 16 plants has been based on annual yield, total yield and the yearly cycle, while others not finally selected have been marked for observation, notably among those that showed a decreasing yield from 1939.

*Chap. III (Krug and Carvalho)* deals with genetical work carried out by the authors on the Bourbon variety and the behaviour of progenies of selected trees.

596. JARAMILLO, J. H. 633.73-1.543.1

Shading of coffee in Latin America.

*Mon. Bull. Coffee Bd, Kenya*, 1942, 7: 97.

Articles on the shading of coffee appearing in *Revista del Instituto de Defensa del Café de Costa Rica* are summarized in English by R. W. Rayner. The natural home of coffee is in the tropical woods of Abyssinia between 7° and 9° N. When grown in other conditions than these the plant has to adapt itself to an environment that is not normal. The degree of adaptation necessary to uncongenial climates may be lessened by the use of shade. From the fact that in the chief coffee producing country in the world [not named] no shade is used it may be deduced that the difference in latitude between this region and that of the natural home of coffee is associated with a change of climate that makes shade unnecessary. By the reduction of shade on an estate where it has been maintained at a certain intensity for a number of years the production of low quality coffee has

been increased by as much as 30% through overbearing. A cool and uniform mountain environment maintains a certain temperature level and light intensity which seems to cause the elimination of certain acids and essential oils and the formation of others during maturation of the bean. Insufficient light impedes these reactions. Excess of light, while causing greater photosynthetic activity adversely affects the formation of those volatile substances which produce the characteristic mildly acid flavour of coffee grown at certain altitudes. Premature ripening due to excessive sunlight gives a bitter taste similar to that of unripe coffee, since in both of these the mucilaginous substances essential to fermentation are lacking.

597. JOLLY, A. L. 633.74  
Cacao industry of Trinidad. Summary of results of detailed examinations of certain fields in Rio Claro, Moruga and Toco districts of Trinidad. *Trop. Agriculture, Trin.*, 1942, 19: 127-9.

The results support the improvement policy recommended by Shephard (*Ibidem*, 16: 247-51; *H.A.*, 10: 693). These field examinations show that there is sufficient scope in the improvement in the still profitable fields alone to absorb a very large supply of cuttings and bring about substantial improvements in the fields.

598. WEST, J. 633.74  
On the future of cacao in Oyo Province [Nigeria]. *Farm and Forest*, 1941, 2: 141-3, bibl. 1.

A recent suggestion that cacao could be used as a remunerative lower storey in regenerated and planted forest in Nigeria is discussed. To maintain the Oyo cacao industry at its present standard of 60,000 tons annual export the existing forest reserves containing suitable land would be insufficient and every endeavour should be made to preserve part of the existing cacao by methods proved successful in other countries, as well as planning for new plantings in forest reserves.

599. HUMPHRIES, E. C. 633.74-2.19  
Wilt of cacao fruits (*Theobroma cacao*) I. An investigation into the causes. II. A preliminary survey of the carbohydrate metabolism with special reference to wilt susceptibility. *Ann. Bot. Lond.*, 1943, 7: 31-44, bibl. 13 and 7:45-61, bibl. 13.

I. The investigations reported have been carried out over 3 years at the Imperial College of Tropical Agriculture, Trinidad, using mature budded and grafted trees, ordinary estate trees and young clonal trees from the Imperial College selections. Evidence is brought to support the theory that cacao wilt of fruits is primarily due to nutrient and water deficiency. The position of fruits on the tree may be influenced by the moisture relations of soil and atmosphere. During and following periods of high humidity the fruits were more scattered over the tree. Weather conditions could not be correlated with any incidence of wilt.

II. A brief survey is given of the changes in water content, dry matter, carbohydrates, glycosides and fat of the wall and pulp of the cacao fruit during development, as a starting point for a detailed investigation of the numerous metabolic changes which are outlined. The growth period of the fruit can be divided into two phases: a development phase of 75 days during which the fruit is susceptible to physiological wilt, succeeded by a period of active metabolism, during which fat, starch and sucrose accumulate in the seed.

600. BAKER, R. E. D. 633.74-2.4  
Witches' broom disease investigations. III. Notes on the occurrence of witches' broom disease [*Marasmius perniciosus*] of cacao at River Estate, 1939-42.

*Trop. Agriculture, Trin.*, 1943, 20: 5-12, bibl. 1.  
The observations were recorded on 76 cacao trees situated at River Estate, Trinidad. In the 3 years the disease spread

very rapidly but probably had not reached its maximum intensity. Trees producing many brooms one year are likely to do so the next, trees producing only a few brooms produce only a few in the following year. This applies to both fan and cushion brooms. Cushion broom numbers and flower production are closely correlated but apparently not fan broom and leaf flushes. Any form of resistance to the disease which may be found is likely to be not an inherent protoplasmic one but more probably some form of disease avoidance in the vegetative tissues of certain trees. Trees showing resistance to fan broom will not necessarily show any corresponding resistance to cushion broom, but might still be of considerable value in the control of the disease, especially if they only flowered sparsely and so avoided much cushion infection. Although the witches' broom under observation can be classified as exceedingly severe it only caused a direct loss of 10% of the pods which came to maturity. A positive correlation existing between the sporophore index for a given week and the total number of brooms appearing, say, 5 weeks later, seems a strong indication that the supply of spores is a major controlling feature in this disease.

601. VINE, H., THOMPSON, H. A., AND HARDY, F. 633.74-1.4  
Studies on aeration of cacao soils in Trinidad III. *Trop. Agriculture, Trin.*, 1943, 20: 13-24, bibl. 8.

602. TIDBURY, G. E. 633.832: 581.14  
Stem-girth as a criterion in field trials with young clove trees. *Emp. J. exp. Agric.*, 1943, 11: 33-7, bibl. 2.

It is indicated that a positive correlation exists between stem-girth and canopy-area in young clove trees; between stem-girth and yield; and between stem-girth corrected for canopy and yield in older trees. As the girths of groups of young clove trees tend to remain in the same relative order of magnitude over a gap of several years, i.e. from the seedling to the bearing stage, it is held that stem-girth affords a useful criterion in field trials with young cloves in the pre-bearing stage. [Author's summary.]

603. CHILD, R., AND NATHANIEL, W. R. N. 633.85  
Hydnocarpus oils in Ceylon. *Trop. Agriculturist*, 1942, 98: 2-7, bibl. 4.

Seeds of *Hydnocarpus wightiana* and *H. kurzii* grown in Ceylon have been examined. The former is to be preferred as a source of chaulmoogra oil by reason of the better suitability of the oil for medicinal purposes, the higher oil content and better keeping qualities of the seeds. Only *H. wightiana* was, in fact, recognized by the B.P. 1932 as the source of *Oleum hydnocarpus*, though *H. kurzii* was apparently the historic origin of chaulmoogra oil and so appears in the P.B. Codex, 1934. *H. wightiana* could easily be grown in sufficient quantity for local demand in Ceylon, but failing that or external supply it is suggested that alternative oils conforming to the U.S.P. XI or other pharmacopoeia could be used. The U.S.P. XI includes under *Oleum chaulmoograe* the oil derived from any species of *Hydnocarpus*, provided it agrees with the specifications.

604. PAUL, W. R. C., AND GAYWALA, P. M. 633.853.74  
The cultivation of gingelly in Ceylon.

*Trop. Agriculturist*, 1941, 97: 321-6, bibl. 1.  
*Sesamum orientale* (gingelly in Ceylon and S. India and til in N. India) is a quick growing annual extensively cultivated for its oil-bearing seed. The oil is used in cooking, in the manufacture of margarine, soap, etc., being a good substitute for olive oil. The seed besides its high oil content contains a high proportion of protein, calcium and phosphorus. The plant and some varieties are described. The seed is sown in drills 1-1½ ft. apart, at 2 lb. per acre or in alternate rows with green gram or cowpea. It germinates in 6 days and is thinned to 6-8 inches when 3 weeks old. Harvesting



must begin when the leaves have yellowed and the first capsules have begun to burst. Delay will result in loss. The method of harvesting is by cutting with a sickle to ground level and stooking erect in a shed with a clean hard floor and open sides for 7 days. The leaves will drop and the capsules turn brown. The sheaves are then taken to an open drying floor and exposed to the sun. The capsules shatter and seed still remaining is extracted by beating with a mallet or by rolling. The final cleaning is by winnowing. Oil percentage varies from 35 to 47 according to variety and method of extraction. The white seeded varieties give a better quality oil than those with coloured seed. Seed for future sowing is stored while still hot from sun-drying in clean bins with closely fitting lids and covered within by a layer of 3 inches of dry sand.

605. PYENSON, L. 633.854-2.76  
Three curculionid pests of the officina nut.  
*J. econ. Ent.*, 1942, 35: 715-8, bibl. 4.

Three weevils attacking the oil-bearing nuts of the forest tree, *Licania rigida*, in Brazil are discussed in the light of such details as are known of their life histories. The great height of the trees makes control difficult. Ripened nuts should be picked up twice weekly and none left on the ground, and to make certain of this the ground should be kept clean beneath the trees. The oil should be extracted as soon as possible as the larvae continue to feed and cause the loss of much oil. Nuts dropping prematurely should be collected and burnt.

606. BERTRAND, H. W. R. 633.912-2.64  
Prevention of damage to young rubber by snails and slugs.  
*Trop. Agriculturist*, 1941, 97: 327.

Since meta became unobtainable coconut bristle fibre at the rate of 2 or 3 oz. per tree is tied round the middle of the stem with the lower ends projecting downwards and outwards. The bundles must not be tied too lightly or with too strong fibres. The cost is between 1½ and 2½ cents per plant and is 100% effective. Slug and snail attack is usually confined to limited areas or even to individual plants so that the already small costs can be reduced by making the banding selective.

607. FERRAND, M. 633.912-1.5  
Directives pour l'établissement d'une plantation d'hevea greffés au Congo belge. (Instructions for the establishment of a plantation of grafted *Hevea* in the Belgian Congo.)  
*Publ. Inst. nat. Étude agron. Congo belge (I.N.E.A.C.) Ser. tech.* 25c, 1941, pp. 39, bibl. 18, 25 fcs.

The instructions for rubber planting cover choice of site and planting material, preparation of the ground, spacing and layout, cover cropping, upkeep including pruning, thinning, etc., tapping and manufacture. The directions are based on Far Eastern practice adapted to West African conditions.

608. COOK, O. F. 633.913  
More rubber from castilla.  
*Agric. Amer.*, 1943, 3: 7-9.

The implications are discussed of an accidental discovery that rubber latex can be coagulated inside the bark of *Castilloa* spp. by the application of sufficient heat to destroy the oxidizing enzyme that prevents coagulation and eventually reduces the rubber to a soft adhesive paste. When the enzyme has been destroyed it is suggested the felled trees should be allowed a short period for decay after which the inner rubber-bearing layers of the bark may be separated. At first the many abandoned *Castilloa* plantations in Mexico and Central America could be treated but eventually a stabilized industry would follow forestry methods in growing the trees and lumbering the trunks and branches to a mill for extraction of the rubber, with the bark fibre

and wood as by-products. Self-renewing *Castilloa* forests could readily be established. The method of tapping normally used in S. America is to fell the tree and then ring the trunk and larger branches. Although 20-50 lb. is extracted from the larger trees the latex flows only to the extent of relieving the bark pressure and several times as much rubber must be left in the bark. *Castilloa* cannot be tapped at frequent intervals as with *Hevea* because the latex tubes do not form a continuous network, so that the bark pressure adjacent to the wound is not restored.

609. SCHULTZ, E. F. 633.913  
El guayule en Tucuman. (Guayule in Tucuman.)  
*Circ. Estac. exp. agric. Tucuman* 107, 1942, pp. 4 and *Rev. industr. agric. Tucuman*, 1942, 32: 148-52.

A general account of guayule rubber with a note on its cultivation at the Tucuman Experiment Station. If it should be economically possible to grow it locally it is only the present crisis that makes it so. The local smallholders are not interested.

610. MACDONALD, K. R. 633.931  
The gum arabic industry in Bornu Province.  
*Farm and Forest*, 1941, 2: 13-6, bibl. 3.

The highest quality of gum arabic is produced by *Acacia senegal*, found throughout the dry thorn forests of Northern Nigeria, but only in Bornu Province in sufficient quantity to merit exploitation. The main source of supply for the world's markets is the Sudan. The article describes the attempts of the authorities to render the natives "gum-conscious". The exudation is due to an infection and is very slight on healthy trees. Exudation can, however, be stimulated by tapping. The upper edge of the sharp narrow-bladed native axe is inserted under the bark without damaging the cambial layer; the whole cutting edge is then gradually forced through to isolate a strip of bark about 1 in. wide. By a sharp lever-like movement the strip is broken and one end pulled up and the other down the branch which is being tapped. Thus a strip of bark 1 in. wide and 3 ft. or more long is removed. The gum forms gradually along the tapping wound and will be ready for collection in about a month.

611. SEN, P. K. 634.441: 581.145.1  
Production of flowers on rootstock stems of mango grafts in the nursery.  
*Indian J. agric. Sci.*, 1942, 12: 523-4, bibl. 2.

A few seedling rootstocks of mango after inarching produced flowers and in some cases fruit before the tie had been loosened, though after the scion had been detached from the parent tree. The stocks were between 2 and 3 years old, and in pots. Normally a seedling mango does not flower till it is at least 6 years old. The scion trees, 3 varieties, were exceptionally floriferous that season and many grafts flowered from their scion shoots, including all those which also flowered on the stock. It is suggested that the exceptionally favourable condition for fruit bud formation of the parent trees was conveyed to the stock while it was still attached for inarching. This phenomenon at Sabour Fruit Research Station, Bihar, has not previously occurred there within memory, 30 years. It seems to be of interest in connexion with fruit bud formation studies. Topping the rootstock stem above the graft union or cincturing by the grafting tie can scarcely be the cause, since they are normal factors always present.

612. JONES, W. W., AND SHAW, L. 634.57: 581.192  
The process of oil formation and accumulation in the macadamia.  
*Plant Physiol.*, 1943, 18: 1-7, bibl. 16.

The variety studied at the Hawaii Agricultural Experiment Station was *Macadamia ternifolia* var. *integrifolia*. 1. Beginning at approximately 90 days after flowering of Macadamia, embryo enlargement and accumulation of oil are very rapid;

70% of the oil is formed in 44% of the total growth period of the fruit. 2. The material utilized for oil formation moves into the fruit from outside sources. Oil synthesis and protein synthesis occur simultaneously. 3. In the early stages of oil synthesis short chain saturated fatty acids are formed first and accumulate; later, long chain unsaturated fatty acids are formed. 4. Hexose sugar is apparently the starting point for oil formation. From the sugar, short chain saturated fatty acids are formed. The short chain acids are converted into long chain unsaturated fatty acids as synthesis proceeds. 5. In the early stages of oil formation the short chain acids and glycerol do not combine probably because of the absence of the proper esterase. [Authors' summary.]

613. BEIRNAERT, A., AND VANDERWEYEN, R.

634.6-1.531

Les graines sélectionnées livrées par la station de Yangambi. (The selected oil palm seed distributed by the Yangambi Experiment Station.) *Publ. Inst. nat. Étude agron. Congo belge (I.N.E.A.C.) Ser. tech.* 28, 1941. *Commun. sur le Palmier à Huile* 2, pp. 41, 1941, 15 fcs.

General rules are laid down for the choice of oil palm seed parents. The types having occupied this role are discussed. Owing to the heavy and increasing demand for seed the Station yielded to the representations of the government and lowered the high standard of selection that they had set themselves rather than see plantations made from seed of trees whose potentials were unknown. The present criteria for the selection of seed parents are as follows. A large flower spathe with over 160 flower spikes but with less than 12 flowers per spike on the middle or lower parts of the spathe. The fruit should consist of at least 70% pulp and about 10% kernel. Length of stipe should not exceed the average for the field, the palm should be dwarf with large petiole bases, a good yielder, not too leafy (under 30 for a 16-year tree) but with large and numerous folioles. The pollen parents in the case of artificial pollination should be 2.5-3 times more productive than the average and there are other important considerations which are discussed. Useful accounts are given of the technique of selecting the seed parents, of recording yields, of analysing the probabilities among the provisional selections and of collecting and using foreign pollen. Artificial pollination has been found to reduce normal yield by about 15%. The probable reasons for this are to be found in the reduction of leaf area which is necessary in order to isolate the inflorescences.

614. BEIRNAERT, A., AND VANDERWEYEN, R.

634.6

Influence de l'origine variétale sur les rendements. (Influence of varietal origin on yield of oil palms.) *Publ. Inst. nat. Étude agron. Congo belge (I.N.E.A.C.) Commun. sur le Palmier à Huile* 3, 1941, pp. 26, 20 fcs.

As a result of studies over a period of years at the experiment station at Yangambi, Belgian Congo, 3 genotypically distinct types of oil palm have been distinguished. These are var. *pisifera*, var. *dura* and var. *tenera*, which is not a true variety but a somewhat unstable hybrid almost certainly of *dura* and *pisifera*. From the economic point of view *tenera* is by far the most interesting but unfortunately when self-pollinated it only produces 50% *tenera* seedlings, the remainder being equally made up of *pisifera* and *dura*. The hereditary constitution of these varieties is then discussed and the results obtained from intercrossing them are set out. Three chapters deal with results to be expected from seven of these crosses as regards oil content and yield per hectare with and without elimination of sterile palms. As regards yield the most productive cross is *dura* × *pisifera* which produces pure *tenera* type only and is in yield of oil per ha. 15% higher than the next best cross *tenera* × *dura* and 40% better than *tenera* × *tenera*. Finally the subject of the most economic planting density for the various

crosses is discussed including the selective thinning of sterile palms necessary in the case of some crosses.

615. BEIRNAERT, A., AND VANDERWEYEN, R.

634.6-1.543

Note préliminaire concernant l'influence du dispositif de plantation sur les rendements. (Influence of layout on yield in oil palm plantations.) *Publ. Inst. nat. Étude agron. Congo belge (I.N.E.A.C.) Ser. tech.* 27, *Commun. sur le Palmier à huile* 1, 1940, pp. 26, 10 fcs.

Yield is affected by planting density in the case of oil palms through the number of palms and through the average yield of individuals. Where competition is strong even a slight reduction in number will increase yield considerably, but successive thinnings will be less and less effective. These studies carried out at the Yangambi Research Station, Belgian Congo, are directed to finding the optimum density that will produce the maximum yield. The factors considered are the effect of spacing on yield and the effect of growth on yield. Yields from palms at different spacings with and without selective thinnings are analysed. It is concluded that, generally speaking, a spacing of 7.5 m. in line and 8 m. between the lines is superior to all others in the case of unselected plantations. But since cutting out the sterile palms is imperative, if the maximum yield from the plantation is to be obtained, it is better that the original planting should be 6 m. in the lines and 8 m. between them.

616. MENON, S. R. K.

634.61:581.14

Some observations on the growth of the coconut fruit with special reference to some of the changes undergone by the fibrous constituent of its mesocarp.

*Indian J. agric. Sci.*, 1942, 12: 423-32, bibl. 4.

Certain changes undergone by the various components of the coconut fruit during the year required for its growth have been traced by means of experiments carried out over a period of about a year on selected bunches of three different trees. Weight and volume of the fruit, measured in C.G.S. units, are nearly equal for the first 6 months of growth. After this period the weight of the nut declines to less than half the maximum value reached owing to the rapid drying up of the husk, although the kernel continues to increase in weight. There is but a slight diminution in volume. There was no increase in the non-lignin present in the fibre of the husk after the first 6 months of growth. The practical significance of this is that no loss of fibre yield results from picking still green nuts and a cleaner and whiter fibre is obtained. The advantage thus obtained in colour and gloss is of the greatest importance in its effect on prices. The process of lignification is attended by a perceptible diminution in specific gravity of the lignified material, a fact considered to be of great theoretical significance. The cellulosic portion of coir fibre is shown to be very rich in furfural-yielding substances from the beginning. Non-fibrous matter separated from the fibres of immature nut husks by boiling in dilute sodium sulphite solution forms a fine sticky paste of tough consistency, capable when dry of being manufactured into a variety of articles (now styled Menonite products and patented). The entire husk is used of immature fallen nuts which would otherwise be wasted. The fat content of the kernel continues to increase as long as growth continues, thus the late picking required by the oil industry conflicts with the early picking required by the coir interests.

617. LEACH, R.

634.771-2.42

Soil conditions affecting production of perithecia in banana leaf spot disease.

*Nature*, 1943, 151: 199.

The production of the perithecia of banana leaf spot (*Cercospora musae*) in Jamaica is mainly seasonal, i.e. between August and January. It has now been found that in a few isolated areas perithecia are produced abundantly throughout



the year. This out-of-season production is positively correlated with highly acid soils (pH 4.0-4.75 approximately). The regular 3-weekly sprayings are useless in these cases. Control has been obtained with the weekly heart-leaf spraying method, but this is only practicable when the plants are small. No similar example of soil conditions affecting the fructifications of a leaf spot fungus can be found in available literature and the problem is at present unexplained.

618. SANÉ, V. 634.774

A note on pine-apple.

Bull. U.P. Dep. Agric. Fruit Ser. 9, 1942, pp. 10, bibl. 6.

The methods most suited to the United Provinces of growing pineapples commercially are outlined, comparisons being made with those of other pineapple countries. In most of India the pineapple has to be grown under shade as a protection from the too fierce rays of the sun and in some districts from frost. In Pilibhit, the largest pine district of the U.P., this shade is often too dense, affecting the quality of the fruit adversely. The distinctive Indian types of pineapple have nothing to recommend them and are being rapidly replaced by such varieties as Queen, Kew and Mauritius. Propagation by suckers, slips and crowns is described, but of late that of rings  $\frac{1}{2}$  inch thick cut from old stumps soaked for 5 minutes in 4% permanganate of potash and well dried before planting in nursery beds has proved a rapid and successful method of increase. Some notes are given on the preparation of the soil. The crop needs thinning of suckers if good fruit is desired and propagation material and only two of the strongest suckers should be allowed to remain on each plant. Suggestions are made for manuring and practices in other countries are mentioned. Instructions are given for picking. Fruit for canning is picked rather ripe than that for distant markets. The deterioration in type in U.P. pineapples is attributed to faulty selection of propagating material, crowns being much used instead of suckers, and to defective methods of cultivation.

619. BRIANT, A. K., AND TIDBURY, G. E. 634.774

Pineapple experiments in Zanzibar.

E. Afr. agric. J., 1942, 8: 80-4, bibl. 4.

The results of a manurial and spacing experiment on pineapples are described up to the end of the second canning season. Applications of sulphate of ammonia caused increases in (1) the number of pines reaped per acre; (2) the total weight of fruit reaped; (3) the average weight of fruit, and (4) the number of pines which matured in the first month of both the first and second canning seasons. Sulphate of potash and possibly superphosphate appear to have had a depressing effect on yield and on the fruiting processes in general. Close spacing in the field caused large increases in the weight and number of fruit harvested per acre, but decreased the average weight of the individual pines. [Authors' summary.]

620. NIGHTINGALE, G. T. 634.774-1.83+1.85

Potassium and phosphate nutrition of pineapple in relation to nitrate and carbohydrate reserves.

Bot. Gaz., 1942, 104: 191-223, bibl. 60.

In pineapple a low nitrate reserve was found adequate for

greatest possible yield of fruits when carbohydrates were low but when they were high maximum production was not obtained unless plants were filled to capacity with nitrate. With low carbohydrate concentration and therefore little nitrate phosphate is freely absorbed. Under favourable carbohydrate forming conditions on the same site more nitrate is needed. With higher nitrate there is a proximately corresponding suppression of phosphate absorption so that it becomes necessary to apply phosphate. The required level of nitrate nutrition, which varies with opportunity for carbohydrate accumulation, is intimately associated with potassium requirements. Examples are given. In plants on soils notably low in potassium and phosphorus there was seemingly an interplay in compensating relationships which resulted in a greatly reduced size of fruit and plant but did not affect physical characteristics, percentage of sugars or total acids compared with plants more adequately nourished. Phosphorus is necessary in relatively high concentration just prior to and during blossom-bud differentiation and an adequate supply of nitrates in relation to carbohydrates is also essential at that time. Application of phosphate to plants high in phosphorus and deficient in nitrate might bring about still further nitrate deficiency and decrease in yields, although the suppressing action of even high concentration of phosphate on nitrate absorption is less common than that of nitrate on phosphate intake. [From author's summary.] The work was carried out on behalf of the Hawaiian Pineapple Co., Honolulu.

621. ANON. 635.62

Choco, chayote or chucu.\*

Gdnrs' Chron., 1943, 113: 41.

A note on *Sechium edule*, a cucurbit which in view of present emergencies is interesting American gardeners. Under tropical conditions the plant is a vigorous grower. The foliage can be eaten as spinach, the fruits as vegetable marrow, while the fleshy yam-like tubers can be eaten boiled or baked. In the Southern States of U.S.A. growth may be up to 60 ft. in one season and a plant will carry up to 600 fruits. [According to Ochse in "Vegetables of the Dutch East Indies", the plant requires a rich soil and a strong latticework to climb over,  $1\frac{1}{2}$  to 2 m. above ground level. The lattice in Java is usually placed over fish ponds. The moisture suits the plant and shade is provided for the fish.—ED.]

622. FERNANDO, M., AND UDURAWANA, S. B.

632.8: 635.648

The nature of the mosaic disease of bandakka

(*Hibiscus esculentus* L.).

Trop. Agriculturist, 1942, 98: 16-24, bibl. 6.

This mosaic disease of *Hibiscus esculentus* is not seed borne and is not transmissible mechanically. It can be transmitted by bud grafting and is presumably spread by an insect vector at present not known.

623. MÜLLER, A. S. 635.65: 632.4

Enfermedades de las caraotas, frijoles y habas en Venezuela. (Diseases of beans in Venezuela.)

Circ. Inst. exp. Agric. Venezuela 1, 1940, pp. 14.

## STORAGE.

624. PHILLIPS, W. R. 664.85+664.84

Construction and operation of a home storage for fruits and vegetables.

Publ. Canada Dep. Agric. 743, 1942, pp. 14, being Fmrs' Bull. 113.

Notes and diagrams show how to construct a store, probably inside a basement or other building, which under Canadian conditions will afford an equable temperature of about

30° F. to 40° F. for storage of apples and vegetables. The questions of humidity and ventilation are considered.

625. LLOYD, J. W. 664.85.25.037

Notes on precooling peaches and the use of ventilated packages.

News Lett. Ill. St. hort. Soc., 1942, No. 8, pp. 3-4.

\* Also known as christophine.

The results are summarized of experiments on the precooling of peaches carried out by the Agricultural Experiment Stations of Illinois, Indiana and California. To retard ripening during transit and to control rot-producing fungi the temperature of the fruit—which may be as high as 85° F.—must be reduced below 50° F. as quickly as possible. By precooling this reduction can be obtained in 8 hours instead of 48 taken in ordinary refrigerating cars. Two methods have been used in Illinois. In one, electric fans are placed at the top of each ice bunker in the car, salt is added to the ice and cold air is forced from the top of the bunker over the top of the load, thus cooling most rapidly the hottest part of the load. 200-800 lb. of salt per car may be used. The fans are worked off the local electricity supply. The second type is a portable refrigeration plant mounted on a motor truck chassis, and supplying its own power. This plant forces cold air into the car above the load through the upper part of the doorway at one side of the car, drawing it back into the machine through an opening near the bottom of a false door that is fitted into the doorway of the car. In this method the ice in the bunkers has no relation to the precooling. If, instead of the standard tub bushel basket, ventilated bushel baskets were used, precooling was reduced from 12 to 6 hours. The use of a ventilated cap or pad still further reduced the time.

626. MANUEL, H. L. 664.85.872.037  
Cold storage of grapes experiments.  
*Agric. Gaz. N.S.W.*, 1942, 53: 333.

With grapes stored at 31° F. and at 35° F. meta bisulphite or sodium bisulphite mixed with the packing cork effectually prevented mould growth. The sodium bisulphite kept the stalks a better colour than the meta bisulphite. Suitable doses seem to be 7 grammes per half case of sodium—and 12 grammes per half case of meta bisulphite, the amounts being increased by 36% for export size cases. A temperature as low as 29° F. is recommended.

627. ROHRBAUGH, P. W. 664.85.334: 547.313.2  
Measurement of small concentrations of ethylene and automobile exhaust gases in their relation to lemon storage.  
*Plant Physiol.*, 1943, 18: 79-89, bibl. 18.

The paper describes work carried out at the California Fruit Growers Exchange on the epinasty test with pea seedlings whereby small quantities of ethylene in fruit rooms can be measured. There is a close relationship between the amount of ethylene necessary to colour lemons and that necessary to cause epinasty in pea seedlings and this has been found to be 1 part ethylene in from 20 to 40 million of air. The test is easily set up and maintained, the only technical skill required being to estimate the extent of epinasty in pea seedlings compared with that of the controls. In heavy traffic areas on account of the fumes it is not always easy to keep the control plants free from ethylene.

628. ROHRBAUGH, P. W., AND MACRILL, J. R. 664.85.334: 547.313.2  
Ethylene in lemon storage rooms  
*Calif. Citrogr.*, 1943, 28: 118.

Ethylene can enter citrus storage rooms from fruit decaying with green mould and from exhaust fumes of petrol engines such as lorries concerned in the business of the store. 1% of green mould in a store will double the respiration rate of all lemons in the room and therefore double the heat given off. It would take about 18,000 lb. of additional ice per day to remove the heat caused by this small amount of ethylene in a 100. car storage. The premature ripening caused by the ethylene shortens the storage life of the fruit. The presence and approximate amount of ethylene can be detected by the pea test. Pea seedlings are germinated in peat moss and sand and grown in a constant temperature in the dark to produce elongation and so render the results of the test easy to observe. When 1 in. high the seedlings

are placed in a metal container made so that air can circulate through it but the light is kept out. It contains for heating purposes two foil-covered 15-watt bulbs connected in series. The container is placed in the store to be tested. If there is ethylene in the store sufficient to increase the rate of colouring of lemons and so shorten storage life the peas will bend over, and the greater the amount of ethylene the more marked are the curvatures. Ethylene can be kept low by removing the cause of production, e.g. decaying fruit, by preventing the entry of exhaust fumes, possibly through the air conditioning system, by admitting the maximum amount of fresh air with sufficient movement, by introducing such gases as certain chlorine compounds or ozone in small quantities and by treating the water in the air washes with some such material as hypochlorites or chloramines to oxidize the ethylene which has been washed out of the recirculated air. The air washer water sometimes accumulates appreciable quantities of ethylene and it is important it should be kept free.

629. BARNELL, H. R. 664.85.771  
Studies in tropical fruits XIV. Carbohydrate metabolism of the banana fruit during storage at 53° F.  
*Ann. Bot. Lond.*, 1943, 7: 1-22, bibl. 10.

The changes in the amounts of dry matter, starch, sucrose, glucose, fructose, glycosidic-glucose and titratable acidity have been followed in the pulp and skin of detached branches of Gros Michel bananas of commercial grade during storage at 53° F. at the Low Temperature Station, Imperial College of Tropical Agriculture, Trinidad. The deviations observed in bananas ripening at 53° F. from those ripening at higher temperatures are due to the differential effects of temperature in slowing down the rates of the different ripening processes and not because of any marked deviations in the type of the carbohydrate catabolic processes. Banana storage to maintain quality must (1) retard the hydrolysis rate of starch to sugars; (2) retard the hemicellulose hydrolysis rate; (3) reduce tannin oxidation in the skins to avoid chill colours; (4) increase tannin precipitation in the pulp to reduce astringency; (5) decrease the rate of water loss from the skin. Methods for furthering these desiderata are discussed.

630. MENENDEZ (LEES), P., AND MIGUEL (ETCHANDY), A. 664.84.64.037  
Conservacion frigorifica de tomates. (Cold storage of tomatoes.)  
Reprinted from *Rev. Facult. Agron. Uruguay* No. 26, November 1941, pp. 18, bibl. 18.

A report on experiments on the cold storage of tomatoes made at the Uruguay Cold Storage Research Station and a brief review of some literature. The varieties Marglobe, Ponderosa and San Marzano were used as being locally well known. The temperature was maintained at from 3° to 4° C. with a relative humidity of 85-90% throughout. Marglobe picked green and cold stored were in good condition 42 days later and had coloured well. Ponderosa and San Marzano kept for 35 days. Stored when just turning colour Marglobe lasted 3 weeks with reduced wastage, the other two kept less well. Stored firm-ripe, Marglobe lost 17% in 2 weeks. The remaining fruit deteriorated rapidly on removal from store, though until then it was of good appearance and flavour. In three weeks it would have been a total loss. Ponderosa was in perfect condition, without waste, after 2 weeks, but in 3 weeks had lost 50%. San Marzano had only lost 34% in the same period. Stored full-ripe, Marglobe lost 17% in 9 and 41% in 16 days. Ponderosa lost 6% and 33% and San Marzano 7% in the same two periods respectively.

631. SETHI, D. R. 664.84.21.037: 631.531  
Cold storage of seed potatoes.  
*Indian Fmg.*, 1942, 3: 470-2.

Cold storage of seed potatoes during the hot months, usually from mid-March to September, is essential in the warm parts



of India. The correct design for a cold storage plant is described and a full account of the treatment is given. The potatoes are stored in slat trays 5 ft. x 4 ft., the depth varying from 6 in. to 12 in. according to size of tuber. There is a free air space of 3 in. above and below each tray and the potatoes are turned once a fortnight to ensure access of air to the middle layers. The temperature in the cold chambers is maintained at 36° F. (during loading at 40–45° F.) with a complete change of air every 6 hours; relative humidity 75 to 80. Before storing the potatoes are precooled in an antechamber for 12 hours at 60°–70° F. When removed for use they are first placed in the precooling chamber where they remain from 24 to 72 hours before exposure. All packing must be done in covered sheds away from direct sunlight. In these storage conditions there is no loss from insect pests or disease and practically none from drying or shrinking. The conditions for storing potatoes for table use are totally different.

632. ALLNUTT, R. B. 664.84.22

A method of storing sweet potatoes.

*E. Afr. agric. J.*, 1942, 8: 73.

Sweet potatoes can be stored for 2 years or more if treated as follows. The tubers are dug and wilted for 2 or 3 days, then placed in cold water, brought to the boil and kept boiling for an hour. They are then removed, cooled and either sliced lengthways into 3 or 4 pieces, or squeezed out as flat as possible with the fingers, and afterwards dried brick hard in the sun. They are now ready for storing, no special storage vessels being required. When required for use the dried roots are washed and boiled in the ordinary way. The result is said to be even more palatable than boiled fresh roots. The method is used by the natives of Sukumaland in the Lake Province of Tanganyika. It is possible that under more humid conditions than are usual in that region the method might be less satisfactory.

633. POWELL, A. A. 664.84.25

Heat storage of onions. Report on trial.

*N.Z. J. Agric.*, 1943, 66: 27–9.

The Department of Agriculture, New Zealand, with the co-operation of Messrs. McFadden, onion growers, of Marshlands, have conducted a trial on the heat storage of onions. The 26,800 onions used had been held in ordinary storage for 3 months before being placed in an experimental chamber, thermostatically controlled at 72°–76° F., relative humidity 70%. Four months later 21,400 were still in excellent marketable condition, loss of weight being nearly

all due to rejection of faulty onions during two examinations. The importance of selecting only sound lines for long period storage is vital. The best keeping variety is Pukekohe Longkeeper. Other varieties and lower grades must be marketed according to condition and keeping quality. Stacking was as follows:—(a) in the usual onion central bag stacked 3 bags high; (b) in central bags placed in racks to remove weight from the onions; (c) in a specially designed storage crate 20 in. x 16 in. x 14 in. Method (a) gave poor results because air failed to circulate sufficiently in the centres of the lower two bags on account of compression. Diseased onions here did not dry out properly and caused the surrounding bulbs to develop root growth. [A preliminary note of this trial, giving an illustrated description of the storage chamber, appears *N.Z. J. Agric.*, 1942, 65: 153, 155.]

634. KATZ, S. H. 623.459: 613.2

Protection of foodstuffs against war gases.

*Industr. Engng Chem. (Industrial Edition)*, 1943, 35: 20–3, bibl. 13.

Owing to the difficulties inherent in decontamination of foodstuffs affected by war gases, protection against contamination is essential. Foods can be effectively protected by hermetically sealed metal, glass or glazed earthenware. Cellophane films are excellent. Multiple wrappings of dense sized paper, cellophane, waxed and coated papers are good. Corrugated paper carbons containing abundant glue or sodium silicate are resistant. Points of weakness are joints, seams, etc. Foodstuffs out of doors should be covered with tarpaulins. Notes are given of possible methods of decontaminating foods.

635. KITCHENER, J. A., ALEXANDER, P., AND BRISCOE, H. V. A. 632.951: 664.8

A simple method of protecting cereals and other stored foodstuffs against insect pests.

*Chemistry and Industry*, 1943, 62: 32–3.

The authors, who belong to the Department of Inorganic and Physical Chemistry, Imperial College, London, claim to have quite recently discovered a new dust which is very much more effective than any previously known mineral dusts for the prevention of insect damage to stored food products. It is a fine white powder produced by chemical process, is chemically inert, insoluble in water, non-poisonous and free from any danger of silicosis. It is about 10 times as effective in destroying grain weevils as the best mineral dusts previously known. The experimental data will be published in due course.

## PROCESSING AND PLANT PRODUCTS.

636. OLLIVER, M. 577.16: 634+635

Ascorbic acid values of fruits and vegetables for dietary surveys.

*Chemistry and Industry*, 1943, 62: 146–8, bibl. 7.

During the past seven years, thousands of samples have been tested at Histon, Cambs., for their vitamin C content by the 2,6 dichlorophenolindophenol method using the technique of Harris and Olliver. Nutritional surveys showed good agreement between the figures thus obtained and those got by analysis. The figures are therefore tabulated here with a warning that they should be used only as an approximate guide where the vitamin C content cannot be assessed by analysis or for more precise assays when frequent check tests are possible. In addition the conditions under which the food has been treated must be known. The average vitamin C contents are given for fruits and vegetables in the state in which they are normally consumed, e.g. apples raw and cooked, asparagus cooked, etc. Various jams are also included. In considering uncooked fruits and vegetables neither variety nor degree of maturity is of paramount importance but degree of freshness

decidedly is. When dealing with cooked fruits and vegetables the method of cooking is very important and is considered here in detail. As regards canned and bottled foods their antiscorbutic values can be taken as similar to those of controlled household-cooked foods. Loss on storage in such products is for practical purposes negligible. In frozen foods the loss of ascorbic acid in the quick factory treatment and subsequent storage is small and provided normal cooking is applied normal fresh values will hold good. Dried fruits and vegetables dried by recently introduced commercial methods likewise retain a high proportion of their ascorbic acid, but the content varies greatly with the methods of drying and it is noted that dried figs, sultanas, raisins, currants and dates have a negligible antiscorbutic value. Fruit and vegetable juices vary in the rate at which the ascorbic acid is lost in storage. With vegetable juices, particularly that of swedes, loss may be considerable. The values given for jams are for freshly made material and would be 20% less if the jams were made from overripe or stale fruit. Further tables are given of (1) average ascorbic acid content of potatoes at

different times of year, (2) ascorbic acid values of cooked cabbage and (3) ascorbic acid content of swede juice.

637. PYKE, M. 635.1/7: 577.16

**The vitamin content of vegetables.\***

*J. Soc. chem. Ind. Lond.*, 1942, 61: 149-51, bibl. 3.

The vitamin contents of a large number of different varieties of vegetables grown throughout the year in the R.H.S. gardens were determined and tabulated. *Vitamin A*. In carrots this vitamin increases with the age of the root but becomes less readily available. Cauliflower leaves possess a high nutritive value. The green parts of salad onions highest in nutritive value are those usually thought to be the least edible. *Vitamin B<sub>1</sub>*. Vegetables, though not containing high concentrations, can be considered as active contributors to the diet. *Vitamin C*. In wartime, vegetables provide almost the sole supply of vitamin C, the green leafy vegetables containing very high concentrations especially when young. Between early and late growing varieties there is a striking difference (up to 5 times as great) in favour of the former so that in assessing the nutritive value of a diet, of cabbage for instance, allowance must be made for the time of year. Vegetables richest in vitamin A appeared to be spinach, cauliflower leaves, parsley, carrots; in B<sub>1</sub>, Jerusalem artichokes, peas, parsley, garlic, spinach; and in C, spring cabbage, sprouts, broccoli, parsley, kale and spinach.

638. WOKES, F., AND OTHERS. 635.937.34: 577.16

**Vitamins in rose hips.**

*Nature*, 1943, 151: 279, bibl. 6.

Rose hips from various wild British species collected last autumn were found to contain carotene equivalent to 6,000 I.U. of vitamin A per 100 g., i.e. about the same as carrots. The vitamin C content ranging from 1,300 mg. to 1,500 mg. per 100 g. shows them to be one of the richest sources of natural vitamin C available in Britain. The dried extracts held at normal temperatures showed practically no loss of vitamin C after 6 months. Vitamin P was also detected in a dried extract at the high rate of 520 G.L. units per g. indicating that the extract is more than 5 times as active as purified hesperidin and more than 70 times as active as fresh rose hips. Normally the dried extract might have been expected to contain only 6 or 7 times as much vitamin P as the fresh rose hips or 40-50 G.L. units per gm. Possible reasons for this discrepancy are discussed.

639. VINSON, C. G., AND CROSS, F. B. 634.451: 577.16

**Vitamin C content of persimmon leaves and fruits.**

*Science*, 1942, 96: 430-1, bibl. 5.

Figures are given which show that leaves of both cultivated and wild persimmons contain large quantities of vitamin C. Comparative figures of mg. vitamin C per kg. of fresh material vary from 20,300 to 32,800 in the leaves as against 2,100 to 3,800 in the green fruits. The values were estimated by Tillmans' method as perfected by others.

640. REDGROVE, H. S. 634.51: 577.16

**Walnuts as source of vitamin C.**

*Food Manuf.*, 1942, 17: 321-2, bibl. 8.

This is chiefly a review of Pyke, Melville and Sarson's results in *Nature*, 1942, 150: 267-8; *H.A.*, 12: 1282. Both articles give recipes for pickling walnuts, both green and white.

641. JULÉN, G. 633.491: 581.192: 577.16

**The potato as a source of vitamin C.**

*Ann. agric. Coll. Sweden*, 1941, 9: 294-309, bibl. 40.

The author continued Westas' work noted above (abstract 470). Some varieties of potato showed much smaller losses of vitamin C during storage than others. The fluctuation within different varieties also differs. Thus

\* A note of this paper also occurs in *Chemistry and Industry* 1942, 61: 433.

King Edward showed a high dispersion index, others a very low one. At the time of sprouting the vitamin is accumulated at the eyes, the sprouts being richer in it than the tuber. The highest quantity of vitamin C was retained in potatoes stored indoors and from this aspect there appears to be no advantage in storing at 2° or 3° C. The outermost 5 mm. is richer than the rest of the tuber. In a comparison of the content of the two concentric outer layers with that of the pith the outer layer was the richest in boiled, the inner in raw potatoes. This can be explained if one assumes that the outer layer is the richest in vitamin C combined with protein which was released during boiling.

642. JENKINS, G. N. 633.491: 577.16

**Ascorbic acid in mashed potatoes.**

*Nature*, 1943, 151: 473, bibl. 1.

Experiments carried out by the Department of Physiology, St. Bartholomew's Medical College, c/o Dep. of Zoology, Cambridge, show that if potatoes are boiled and then mashed and kept hot they lose their ascorbic acid content very quickly. Hence if potatoes have to be kept hot for some time before serving, as is inevitable in communal feeding, they should not be mashed.

643. MEIKLEJOHN, J. 633.491: 577.16

**Loss of thiamin from cooked potatoes.**

*Nature*, 1943, 151: 81-2, bibl. 2.

In the course of assays of thiamin (vitamin B<sub>1</sub>) in potato it was found that the greater part of the vitamin is washed out into the medium in which the potato is boiled and is thus in household cookery likely to be lost. The figures provide an additional argument for always cooking potatoes in their skins.

644. SMITH, O., NASH, L. B., AND DITTMAN, A. L. 664.84.21

**Potato quality VI. Relation of temperature and other factors to blackening of boiled potatoes.**

*Amer. Pot. J.*, 1942, 19: 229-54, bibl. 25.

In New York little or no blackening was found in 232 samples of potato from 6 different localities when they matured under mean temperatures of 70° F. Samples which matured under mean temperatures of 60° F. usually blackened. Blackening was reduced practically to nil by exposure of tubers to storage temperatures of 100° F. for 3 or 4 days and greatly reduced by storage at 90° for a similar period. The factors affecting the incidence of this phenomenon are discussed in detail.

645. MENENDEZ (LEES), P. 577.16: 664.85.047 + 664.84.047

Estado actual del conocimiento sobre las vitaminas y el valor nutritivo de frutas y hortalizas desecadas y deshidratadas. (Present knowledge of the vitamins and nutritional value of dehydrated fruits and vegetables.) [English summary 9 l.]

Reprinted from *Rev. Asoc. Ing. agron. Uruguay*, No. 3, 1942, pp. 3-19, bibl. 49.

The recent literature dealing with the nutritive value of fruit and vegetables and the effect of drying and dehydration upon their vitamin content is briefly reviewed.

646. CRUESS, W. V. 664.85.047 + 664.84.047

**Dehydration of fruit and vegetables.**

*Industr. Engng Chem. (Industrial Edition)*, 1943, 35: 53-61, bibl. 22.

Detailed notes are given on the latest refinements in methods recommended for the dehydration of fruits and especially vegetables and of their packing and storing for overseas use by the Forces of the Allied nations. The dehydration of vegetables for the Army, Navy and Lend-Lease has recently assumed important proportions. Forced-draft tunnel dehydrators using trays and controlled temperature are generally usually employed. General quality of the dried products is better than of those supplied to the A.E.F. in



1917-18 because blanching to inactivate enzyme activity and drying to a low moisture content give dried products of better initial as well as keeping quality. The central air discharge, combination parallel and countercurrent forced-draft dehydrator in use in Canada is efficient for vegetable drying. Vitamin C is largely lost in dehydration and subsequent storage of vegetables; in some cases carotene is unstable to oxidation, and much may be lost. The B vitamins are quite stable during drying and storage. Vegetables should be dried to low moisture content to prevent rapid deterioration in storage. In the dehydration of fruits undesirable colour changes and loss in C and carotene can be minimized by steam blanching, although darkening and loss of these vitamins are more rapid in storage than is the case with the sulfured fruits. Exposure to burning sulfur fumes is the customary pretreatment. Dehydrated fruits require less sulfur dioxide for satisfactory color retention than do the sundried. Much of the California prune crop is now dehydrated instead of being dried in the sun. Most California apricots, peaches, pears and raisins are still dried in the sun, although in normal years considerable quantities of sulfur-bleached seedless grapes and pitted, peeled clingstone peaches are dehydrated. Apples are dehydrated or "evaporated", various types of dryers being used. Inhibition of enzyme action is highly important in the dehydration of vegetables and fruits. [Author's summary.]

647. B., H. R. 664.8.047

**Dehydrated foodstuffs in the tropics.**

*Trop. Agriculture, Trin.*, 1943, 20: 1-3, bibl. 4.

A discussion of the value of dehydrated foodstuffs as an addition to the food supplies of the tropics, and of the possibility of providing them. The diet of many colonial peoples is deficient in the constituents known to be necessary under temperate conditions, particularly those afforded by fruits and vegetables. This might be overcome by the introduction of small dehydrating plants at strategic points which would assist in the production of a more satisfactory diet particularly as regards the protective foods all the year round.

648. GRÈNE, G. 664.85.047 + 664.84.047

Le service de séchage des fruits et des légumes de la ville de Genève. (The municipal fruit and vegetable drying service of Geneva, Switzerland.) *Rev. hort. Suisse*, 1942, 15: 221-4.

An account of a recently established municipal service in Geneva for the dehydration of fruit and vegetable produce belonging to the citizens. The produce is returned to its owners when the process is complete. The inhabitants take full advantage of the installation: and considerable saving of foodstuffs which would otherwise have perished has been effected. Only produce likely to give good results is accepted.

649. ANON. 664.84.047

Desecación de hortalizas al sol. (Sun drying of vegetables.) *Rev. B.A.P.*, 1943, 26: 302: 47, 49, 51, 52, reprinted from *Agric. trop. San Salvador* (undated).

Methods of sun or shade drying vegetables in countries where sufficient sun heat can be depended on are briefly described. The principal kinds of vegetables are dealt with. Except in the case of leafy material a preliminary scalding appears to be necessary.

650. VILBRANDT, F. C., AND SIEG, R. D. 664.85.11: 634.11-1.56

Utilization of cull apples and skim milk. *Bull. Va Polytech. Inst.* 34: 16: 3-52, bibl. 93, being *Bull. Engng Exp. Stat.* 48.

Various food products that can be made with apples and milk either separately or combined are discussed. The description of the trial processes used in the manufacture of the above combination occupies most of the paper.

A plant used to produce 1,000 lb. of product per day is described and a plan of the layout is given. An estimation of the costs of making an apple pulp-skim milk product and an apple juice-skim milk product, using whole milk and disposing of the cream and converting the pomace into pectin shows the former product to be the cheaper.

651. BLAIR, J. S., AND AYRES, T. B. 664.84.656.036.5  
**Protection of natural green pigment in the canning of peas.**

*Industr. Engng Chem. (Industrial Edition)*, 1943, 35: 85-95, bibl. 28.

It has been found that the texture of canned peas is far more affected by cation exchange with the various solutions with which they are in contact during the canning operations than it is by variations in pH level within the median pH range. It is shown how a suitable choice of alkaline reagents applied in a definite sequence enables a normal canned pea texture to be maintained while elevating the pH enough to protect about 60% of the chlorophyll against conversion to pheophytin. A moderate elevation of pH level has an effect on flavour thought to be favourable by most observers. [From authors' summary.]

652. TRESSLER, D. K., PEDERSON, C. S., AND BEATTIE, H. G. 663.813 + 663.818

**Fruit and vegetable juice preparation and preservation.**

*Industr. Engng Chem. (Industrial Edition)*, 1943, 35: 96-100, bibl. 19.

The fruit and vegetable juice industries have greatly increased in recent years largely as the result of flash pasteurization and the general use of enamel-lined cans. The various improvements in technique are here noted. The use of blends is increasing. The method used in producing apple-raspberry juice shows an advance in technique and is described. Research on storage temperatures shows the great effect exerted by storage temperature on flavour retention and on tin corrosion, a low temperature proving much the best. Recent improvements have also been made in vegetable juice preservation and it is found that vegetable juices acidified with lactic, citric or phosphoric acid or with the juice of acid vegetables or vegetable products can be preserved by flash pasteurization at 185° F.

653. SIRCAR, S. M., AND SEN, K. M. 634.441: 581.192

**Effect of temperature and time on dry weight determination of mango pulp.**

*Indian J. agric. Sci.*, 1942, 12: 493-8, bibl. 4.

It was found that drying at 50° C. for 24 hours at atmospheric pressure could safely be used for dry-weight determination of alcohol-soluble and -insoluble portions of mango pulp. In the case of alcohol-soluble material the loss after 24 hours drying at 50° C. is greatest and does not greatly slow down until drying has been in progress for 72 hours. The reason for this maintenance of the rate of loss must be other than dehydration and is attributed to the loss of an alcohol-soluble material in the form of a volatile compound, the nature of which is not yet known.

654. FURLONG, J. R., AND HARTLEY, K. T. 637.682

**Nigerian cassava starch.**

*Bull. imp. Inst.*, 1942, 40: 257-71.

Reports on 2 batches of cassava starch from Nigeria and a discussion on the basis for judging the commercial quality of cassava starch. It is shown as a result that Nigeria can supply the factories of the U.K. with high quality starch. The success of the Nigerian experiments suggests that other Empire countries might profitably compete. Nigeria alone cannot for many years adequately supply the demand. An account is given of the native method of preparation and of an experimental factory set up to make starch on a scale comparable to what might be expected in a single village, using only native appliances or such imported ones as are commonly available in the country.

655. GREENWAY, P. J. 547.918  
A use for saponins and some possible local sources.  
*E. Afr. agric. J.*, 1942, 8: 84-6, bibl. 4.  
A number of plants indigenous to East Africa are named as possible sources of saponin for use in the production of foaming material suitable for fire extinguishers, etc.
656. BERGERET, G. 664.85.035.5: 547.458.88  
La pectina y su importancia en la elaboración de dulces y jaleas. (The importance of pectin in the manufacture of jams and jellies.) [English summary 10 l.]  
Reprinted from *Rev. Asoc. Ing. agron. Uruguay* No. 4, 1942, pp. 3-8, bibl. 3.

CLEVENGER, J. F. 633.85  
Volatile oils in fennel seed.  
*J. Ass. off. agric. Chem. Wash.*, 1942, 25: 962-3.

SOLIMAN, G., AND MUSTAFA, Z. 547.918: 633.88  
The saponin of fenugreek [*Trigonella foenum graecum*] seeds.  
*Nature*, 1943, 151: 195-6, bibl. 1.

ASENJO, C. F., AND GOYCO, J. A. 633.859  
Puerto Rican fatty oils II. The characteristics and composition of Guanábana seed oil [*Ammona muricata* L. or soursop].  
*J. Amer. chem. Soc.*, 1943, 65: 208-9, bibl. 1.

## NOTES ON BOOKS AND REPORTS.

657. GREEN, D. E. 635.1/7: 632.3/4 + 632.8  
*Diseases of vegetables*.  
MacMillan & Co., London, 1943, pp. 208, figs. 92, 8s. 6d.

The author, writing mainly for the small gardener, describes clearly and in popular fashion most of the diseases of vegetables commonly encountered in Great Britain, giving in each case suggestions for their control. A key to the symptoms under the headings of host plants should make identification easy. Diseases of potatoes, mushrooms, and some of the more unusual vegetables are included. The photographic illustrations are on the whole excellent. The book, which is well produced, contains few statements which would be seriously criticized and should be widely used.

L.O.

658. STEPHENSON, C. C. S. 634.3  
*A manual of tropical citrus culture*.  
Harrisons & Crossfield, Ceylon, 2nd English edition, 1942, pp. 88, bibl. 22, Rs. 1.50.

The author, a well-known grower of citrus in Ceylon, provides such simple direct advice as will aid other growers to surmount their many problems. His information, scientific and practical, has been collected from many quarters, from the Ceylon Agricultural Department, from technical literature and from personal experience. This second edition, issued only two years after the first, has been considerably enlarged by the inclusion of new chapters dealing with the cultivation of the lime, the passion fruit and the propagation of citrus. Although intended mainly for growers in the mid-country regions of Ceylon much of the information can be applied to citrus growing outside the island, in fact many of the sources from which it emanates are foreign, and some of it, as in the case of zinc treatment for mottle leaf, is as yet untried in Ceylon. In such cases a cautionary word is given. A close examination fails to reveal any notable omissions, yet in his 88 pages the author even manages to include chapters on the preparation and bottling of fruit juices and on dietetics, not to mention one on the passion fruit. Relevant scientific and not so scientific literature is vast and Mr. Stephenson is to be congratulated on the determined way in which he has refused to be side-tracked into discussions on what he calls "moot points". In this book there is only one way in which each problem should be solved, namely the (usually excellent) way preferred by the author. The style is concise and direct though by no means telegraphic. The print is large and clear. The bibliography might have been more explicit as to dates and origins.

659. ROBBINS, W. W., CRAFTS, A. S., AND RAYNOR, R. N. 632.954  
*Weed control*.  
McGraw-Hill Book Co. Inc., New York and London, 1942, pp. xi + 543, 35s.

Dirt has been described as matter in the wrong place and in similar fashion weeds may be regarded as plants in the

wrong place. The importance and the problems of weed control become apparent when it is appreciated that "the wrong place" is very frequently the ground on which commercial crops are, or might be, growing and that competition from weeds is by no means the smallest difficulty with which the growing crop has to contend. This situation has stimulated extensive researches on weed control and recent years have seen the publication of a considerable volume of original work. Much of this work was admirably summarized about three years ago in Bulletin 27\* of the Herbage Publication Series, but the appearance of a more comprehensive and up-to-date work collecting, sifting, digesting, and arranging this formidable literature is timely and of great interest to all concerned in crop management. Starting on a philosophical note, the authors proceed to a detailed account of the physiology and ecology of weeds. Preventive methods are next discussed with particular emphasis on the use of clean seed and on general farm hygiene. Then physical methods of control based on suitable cultivations and crop rotations, and biological methods, so successful against prickly pear, are outlined. The remaining two-thirds of the book is devoted in the main to chemical methods of control. The underlying principles are treated at sufficient length to enable the subsequent detailed discussions to be presented on a rational basis. Chemical weed killers are divided into contact sprays, translocated sprays, and soil sterilizing agents. Selective sprays, as contrasted with non-selective, are discussed and the interesting possibility is considered of unusually selective actions among organic chemicals. An example is the sodium salt of dinitro-*o*-cresol (Sinox) the use of which is dealt with at some length. Other substances discussed in detail are sodium chlorate, boron compounds, arsenicals and thiocyanates. Machinery suitable for use in weed control in a variety of circumstances is described and profusely illustrated. To conclude, a number of examples are discussed where weed control presents unusual difficulties because of the resistance of the weed concerned, the nature of the crop involved, or the particular location of the infestation. The book carries an abundance of photographs and many figures and tables from the original literature. The wealth of references, though predominantly American, includes some important non-American work, notably that of Blackman on selective spraying with sulphuric acid. The book is beautifully produced and bears no mark of wartime austerity.

660. NICOL, H. 632.96: 632.7  
*The biological control of insects*.  
Pelican Book, 1943, Penguin Books, Harmondsworth, Middlesex, pp. 174, bibls., 9d.

An account of the biological control of insect pests, of the various and often complicated factors involved and of resourceful and adventurous work resulting in brilliant

\* Published by Imperial Bureau of Pasture and Forage Crops, Aberystwyth, 1940, 7s. 6d.



success or temporary failure. Failure in the scientific world, as is exemplified many times in this book, is seldom regarded as conclusive, but merely as an indication that the method of approach is wrong and it so provides a stimulus for further work. The book is written in the style the superior know as "popular" though in this case the subject is so fascinating that attempts to sugar the pill are hardly necessary. The author has a thorough knowledge of his subject and puts it over with a lightness of touch that makes it extremely readable. It is remarkable how much information he has managed to cram into so small a book without any appearance of congestion. He has aptly found space to head most of his chapters with quotations from "Alice through the Looking-glass", though even that young lady's remarkable composure in dealing with the preternatural might have been shaken had she encountered some of the incredible goings on here related of the insect world. There are bibliographies and suggestions for further reading, while a far from easy quiz in which some of the answers are not given at all and the rest are printed upside down on another page will prove irresistible to those who have other work to do. There are some good illustrations. The book will be useful to entomologists for its very complete summary of work accomplished and in being. Those who are newly introduced to the complexities of the phenomena described may well be tempted to exclaim, like Alice's pigeon to the preposterous suggestion that little girls eat eggs, "I don't believe it, . . . that's all I can say".

661. WINE INSTITUTE. 016: 663.25

*Selective bibliography of wine.* (Mimeograph.)

Wine Institute, 85 Second St., San Francisco.

More than 400 references are given of articles or books dealing with every aspect of wine from grape vines. A large proportion of them are American and only very few refer to articles in foreign languages.

662. CANADA. 634/635

*Report of the Minister of Agriculture, Canada, for the year ended March 31, 1942, 1942, pp. 162, 50 cents.*

Horticultural information is given concisely under a large number of headings. In the main the most interesting accounts are those referring to the Division of Botany and Plant Pathology, Division of Chemistry, Division of Entomology, Division of Horticulture, Tobacco Division, Division for fruit, vegetables, maple products and honey, and the Experimental Stations or Farms at Kentville, Fredericton, Morden, Summerland, Agassiz and Saanichton, but these by no means exhaust the interest and work on bees, fibres, plant products, drug plants, vegetable seed and a few others is also discussed. It would probably interest tomato growers to know that the new variety Vetomold proved susceptible to a new strain of the leaf mould fungus *Cladosporium herbarum*. It is noted that other hybrids possessing the necessary resistance should soon be ready for use.

663. CANADA, DEPARTMENT OF AGRICULTURE.

633/635

*Experimental Station, Kapuskasing, Ontario, results of experiments 1936-1940, 1942, pp. 43.*

Horticultural work (pp. 30-37) at this station in N. Ontario is devoted chiefly to varietal tests of small fruits, namely strawberries, raspberries, blackberries, black and red currants, gooseberries and garden huckleberries, and of vegetables capable of standing a short growing season. Of nine crab apple varieties set out in 1936 Columbia, Florence and Bedford are doing very well, while Trail and Dongo have died out. Native plums have been substituted for trees which died out. These are growing and flowering well, but so far have failed to set fruit. In 1938, 18 third-cross apple trees were received from Ottawa; 17 were still alive in 1940 and making good growth. Attention is also

paid to the amenity products of horticulture, and ornamental trees, and hedges and shrubs as well as garden flowers continue to receive attention.

664. CEYLON, RUBBER RESEARCH SCHEME. 633.912

*Report of the work of the Rubber Research Board, Ceylon, in 1941, 1942, pp. 44.*

The following experiment results are reported. *Disease.* The addition of soda ash to sulphur dust used in controlling *Oidium* on *Hevea* did not injure the flowers; set of seed was increased, both by the sulphur alone and by an 80-20 sulphur-soda ash mixture because of the protection from mildew thus afforded. *Stock-scion.* In stock-scion relationship trials significantly better growth was obtained with 5 clones budded on illegitimate seedling families TJ 1 and AV 163 than with those on families BD 10, BS 3 and MK 1/1 and unselected seedlings. In an earlier study of comparative root development, seedlings of these two families showed greater mean weight of roots than seedlings of the other families included in the experiment. In another stock-scion trial the yield of BD 5 but not of TJ 16 was adversely affected by the yield of the stock. Comparison with unbudded seedlings even suggest that TJ 16 may have increased the yield of the stocks on which it was budded. It has been confirmed that the influence of yield of stock on yield of scion is unimportant when the latter is tapped on a high cut. *Twinning.* Twinned seedlings measured one year after planting showed a growth deficiency of 22%, compared to untwinned controls. There was no significant difference in growth between the Ramaer and Gambar methods of twinning (described H.A., 12: 1514). *Tapping.* The system 2S/2,d/3,133% is still proving valuable as a temporary high yielding measure on estates in wet low-country districts where bark reserves are satisfactory. Notes and tables are given on the results of tapping system experiments on young rubber. On Dartonfield Estate palm oil applied to newly tapped cortex had no effect on rate of renewal and is therefore being tried on estates where rate of renewal is naturally less rapid. *Replanting* (1936). At present rate of girth increase, stumped buddings will be tappable about 8 months earlier than budded stumps and the latter 16 months earlier than plants budded in the field. *Manuring.* Plots of mature rubber receiving N, NK and NPK have all shown increased yields in 1937, 1938 and 1940 and significant increase of yield over unmanured trees. Growth of trees, bark renewal and dry rubber content of latex were not affected. Recent data have justified a modification in the recommendations for wartime manuring of young rubber and the general mixture for backward areas is now groundnut cake 14 parts, rock phosphate 5 parts, muriate of potash 1 part. Where growth is already satisfactory phosphate alone is enough.

665. JOHN INNES. 634/635

*Thirty-third Annual Report of the John Innes Horticultural Institution, 1942, 1943, pp. 17.*

*Director's report.* Cuttings of new tetraploid apples were received from Professor Nilsson-Ehle of Sweden. *Pomology Department.* Vegetable seeds have been the subject of investigation to discover (1) to what degree certain crops are cross-pollinated, (2) what degree of natural crossing occurs in different kinds at different distances apart, (3) why such crops as marrows and cucumbers often fail to develop a satisfactory crop of seed. Examination continues of the time of flowering of fruit crops and lists have now been compiled giving the approximate flowering time of 320 apple and 138 pear varieties. Incompatibility tests have shown 2 more cross-incompatibles in the diploid cherries, namely the Red Cluster (group IX) and Ramon Oliva (group X). The application of  $\alpha$ -naphthalene acetamide in aqueous solution and in lanolin to the styles and flower stalks resulted in 2 days delay in style abscission in cherries and plums following both treatments. The treatments did not affect the self-incompatibility of the



plants, pollen tube growth being normal. In pears treatment completely inhibited flower abscission and in less severe treatments parthenocarpic fruits were formed. It is suggested that treatment may be useful in increasing fruitfulness, especially with poor cropping varieties. Trials have shown that a temperature of 11-12° C. is the most suitable for storage and slow ripening and one of 19-20° C. for quick ripening of green tomatoes. A most outstanding observation made was that the vitamin C content of green tomatoes was considerably lower than that of red tomatoes ripened in store. The latter attained a content similar to that of those ripened on the plants. The 'blackberry Merton Thornless' is being extensively propagated. It has been patented in the U.S.A. It is hoped to distribute it in this country next year.

**Genetics Department.** John Innes hybrid sweet corn was successfully grown in Cheshire and in the south-east of Scotland. Breeding experiments with barley, beans, maize, tomatoes and drug plants were continued.

**Garden Department.** The area under experiments in 1942 was, fruit 4½ acres, tomatoes ½ acre, small crops 1 acre. Under present conditions trials indicate that muriate of potash used at ½ oz. per bushel of John Innes Compost is a very fair substitute for ¾ oz. of sulphate of potash. Other trials show that dried blood can be used as a substitute for hoof and horn meal, but that combinations with blood are not so satisfactory. Trials in progress suggest that the use of peat as a bulky organic manure dressing may be of advantage. No difference in growth or yield of tomatoes could be detected following equivalent dressings of peat + balanced nutrients and horse manure. Comparative tests of soil sterilization prior to tomato growing showed that the growth of the plants was satisfactory following all treatments, that following chlor-picrin (tear gas) being slightly the best. The elimination of weeds, mainly annuals, was as follows:—steam 100%; chlor-picrin 89%; phenolic compounds 78% and 73%. Other investigations concerned peat and sand samples for potting, the use of hard and soft water for watering, the effects of coal ash and soot on plant growth, methods of composting vegetable waste, and soil cultivations.

A list of publications is included.

666. NIGERIA. 634.6  
*First, second and third annual reports of the Oil Palm Research Station, Nigeria, 1939/40, pp. 13, 1940/41, pp. 22, 1941/42, pp. 26.* (Mimeographed.)

I. 1939/40. The chief aim of the new station is the provision of new improved types of palms which will increase yield per acre and so encourage the use of palm plantations for producing meat and manure urgently needed in the Southern Province. The station is situated near Benin. Forty acres of palms have been planted for the selection programme, part of the area being laid out as a statistical trial to compare the results of self- and cross-pollination on the progenies of the 3 thin-shelled selections. The problems to be dealt with have been resolved into convenient sections such as maintenance, manuring, spacing, diseases and establishing. They will be tackled from as many angles and as quickly as possible. The most urgent problem seems to be the best method of maintaining soil fertility, since under existing conditions this seems rapidly to disappear after clearing the land. Part B reports on the work done by the Botanical Staff on oil palm research during the year. Some data obtained are discussed. Yield in the oil palm appears to be inherited. The difficulty is to recognize an outstanding parent tree since yield *per se*, in view of environmental influences, is not a safe criterion. Number of bunches has an important effect on yield and is an inherited character which can be used in selection. The yield of oil from the progeny of a thin-shelled parent, even if the progeny contain a high proportion of thin-shelled trees, is not so high as the yield of oil from the progenies of the

better thick-shelled parents and the yield of kernels is greatly reduced. The unsuitability of the single palm plot for statistical progeny trials has become manifest. A report on some statistically designed experiments just concluded on the effect on germination of medium, staleness of seed, depericarping of seed and on the variation in germinating power of seed from different sources is in preparation.

II. 1940/41. The layout and working of experiments is described, namely on (1) minimum cost of establishing and bringing into production; (2) burning *versus* non-burning when clearing for new planting. At various substations experiments in manuring, particularly as a cure for yellowing, are in progress. Part B covers the work of the botanical staff including selection, breeding, organization of seed supply and so on. The problems and difficulties involved in the selection programme are discussed.

III. 1941/42. The work of the new research station for the first 3 years of its existence is briefly reviewed. The export value of the oil palm to Nigeria is £6,000,000 in a normal year, it is also a vitally important food crop to a large section of the population. The cost of the station to the Government of Nigeria exclusive of salaries since its origin has been under £6,000. A progress report of experiments mentioned previously reveals no tangible results so far. New experiments laid down during the year are:—

(1) The best method of treating seedlings when transplanting from nursery to field. (2) Improvement or replacement of natural palm groves. (3) Planting and early treatment, chiefly as a precaution against yellowing, (a) normal planting in holes 3 feet cube filled with top soil; (b) as (a) plus heavy mulching during dry season; (c) deep planting in holes 2 ft. deep, i.e. the holes are dug 5 ft. deep and filled with top soil to within 2 ft. of the top. (4) Spacing with grazing and with intercropping. At an outstation an experiment is designed to test the effect of the native habit of severe leaf pruning. Part B. The work of the botanical field staff is recorded. The thick-shelled × thin-shelled crosses may prove of more value than thick-shelled × thick-shelled types. A note on the yellowing disease, mentions that deficiency of N, P, K or Ca does not produce symptoms, at least in seedlings up to 2½ years old but that the disease may be completely cured by the application of wood ash. Results revealed by the examination of voluminous records accumulated over the past ten years on yield, fruit and bunch composition are discussed.

667. RHODE ISLAND. 634/635  
*Fifty-fourth Annual Report Rhode Island Agricultural Experiment Station for 1941, 1942, pp. 62, being Contr. 614.*

A summary of research in many fields. Objects of investigation, the results of which are discussed, include the following: *Boron deficiencies* in rutabagas and mangolds. *Boron* increased yields and decreased water core. *Vegetable crops.* The effects of farmyard manure and varying amounts of N, P and K on a three-year rotation of beets and cauliflowers 1st year, spinach and carrots 2nd year and peppers in the 3rd year are discussed on the yields of those crops. The effects on vegetable crops of organic matter, i.e. cover crops, farmyard manure, and the best time to apply N to the cover crop, are being tested. Many variety and strain trials are in progress. *Tests of availability of magnesium* in different carriers such as dolomitic limestone. *Disinfectant seed treatment of different vegetables.* *Fruit diseases* including apple scab (*Venturia inaequalis*) and black rot (*Phylospora obtusa*) and their control. *Hormone sprays* to check fruit drop were found effective for McIntosh but not for Rhode Island Greening—which incidentally need no such check. *Orchard soil management.* Trials include various covers for peaches and the comparison of a large number of grasses and leguminous plants.



668. TRINIDAD, IMPERIAL COLLEGE OF TROPICAL AGRICULTURE. 633/74  
*Report of the Governing Body and Principal's Report to December 31st 1942.* St. Augustine, Trinidad and Grand Buildings, Trafalgar Sq., London, W.C.2, pp. 23.

The report contains short notes from the heads of the various scientific departments on the work done and some of the results achieved. *Botany.* Statistically significant differences were found between clones in susceptibility to witches' broom disease and to cacao beetle attack. The biggest differences in flowering are between compatible and self-incompatible clones. *Chemistry and Soil Science.* Competition for nutrients by developing leaves has been found to be an important causative factor in pod shedding. Air temperature is one of the factors controlling leaf-flushing. Changes in carbohydrate during flushing were investigated. Cambial activity was initiated over the whole tree during flushing. *Entomology.* Thirty types selected in Trinidad and Granada are under study as being apparently resistant to thrips (*Selenothrips rubrocinctus*). The life history of thrips was accelerated on isolated cacao leaves and may explain the high populations on them. Migration into these light pockets was not observed. *Mycology.* A workable technique has been evolved for the rapid inoculation of large numbers of vegetative cacao shoots or pods for testing resistance to witches' broom disease. A great deal of work still unfinished has not been abstracted. The report concludes with a list of the scientific papers published from the College during 1942.

669. VENEZUELA. 633/635  
*Estacion experimental de Agricultura y Zootecnia. Informe anual 1939. (Report of the Venezuela Agricultural Experiment Station for 1939),* 1940, pp. 80.

The Annual Report of the Venezuela Agricultural Experiment Station gives a brief account of the work done in 1939. Many European vegetables are being grown and the results obtained with the different varieties are briefly noted and may provide useful information. The banana Topocho appears to be immune or highly resistant to *Cercospora* leaf spot. It suffers, however, from a destructive disease presumed to be of bacterial origin.

670. VINELAND. 634/635  
*Report of the Horticultural Experiment Station, Vineland, being reprinted in part from Rep. Minist. Agric. Ontario for year ending March 31st 1942, 1942, pp. 8.*  
ONTARIO DEPARTMENT OF AGRICULTURE.  
*Report of the Horticultural Experiment Station, 1942, Toronto, 1942, pp. 72.*

The second and very much fuller report on the activities of the Vineland Experiment Station is devoted entirely to a brief survey of the various Station activities. It is the first of a new series and it is stated that reports will be prepared primarily for the benefit of the fruit and vegetable growers of the Province. The Station now has control of approximately 180 acres. Its present technical staff consists of a director, E. F. Palmer, and eight others. Work falls into 3 main divisions, namely Extension, Breeding and variety testing, and Research. The breeding and variety projects include vegetables as well as fruit. Brief notes are given of both completed and current research projects, many of the latter being concerned with the following problems:—pruning and training, soil management, soil organic matter,

mineral deficiencies in horticultural crops, soil fertility and effect on raspberry and peach, effect of time of picking on grade and yield of peach, varieties and conditioning of plums for export, pruning and manuring of the Concord grape, time of planting nursery trees, transplanting nursery stock, rootstocks for fruit trees, fruit processing, hormone sprays to control fruit drop, staking and pruning of early tomatoes, asparagus progeny tests.

671. WASHINGTON. 633/635  
*Fifty-second Annual Report of the Washington Agricultural Experiment Station for fiscal year ended June 30, 1942, 1942, pp. 121, being Bull. 425.*

Trials of kok saghyz at Pullman show that it will grow and mature seed in this area. Considerable variation in growth was observed, thus seed was collected from some of the earliest maturing plants 78 days after planting, whereas other plants remained vegetative the whole season. Trials are in progress on the determination of apple maturity by methods involving the transmission of light. Mite control in the orchard is under investigation. Factors affecting efficiency of spray protection are being examined. Among the projects of the Division of Horticulture are the following:—orchard cover cropping; fertilizers; irrigation; use of clonal rootstocks; use of chemical sprays to delay fruit drop, to improve colour, to affect growth in different ways; spray injury problems; fruit maturity tests; fruit storage temperatures; breeding of various truck crops, strawberries, raspberries, blueberries and cranberries with particular objects; grape and truck crop manurial trials; methods of dealing with arsenic-toxic old orchard land. The Division of Plant Pathology reports on running out diseases of strawberries; wilt and root rot of asparagus; diseases of glasshouse ornamentals. The effect of irrigation on fruiting in apples is being studied at the Irrigation Branch Experiment Station. Reports are also presented of work at the Tree Fruit Branch Experiment Station; the Cranberry-Blueberry Laboratory; the Soil and Water Conservation Experiment Station; the Nursery Division, Soil Conservation Service; and finally at the U.S. Fruit and Vegetable Products Laboratory.

672.

The following Annual Reports have also been examined:—

*Seventh A.R. B.W.I. Central Sugar Cane Breeding Station, Barbados for year ending Sept. 30th, 1940, pp. 30.*

*Eighth A.R. B.W.I. Central Sugar Cane Breeding Station, Barbados for year ending Sept. 30th, 1941, pp. 37.*

*Report on the fermentation industries for 1942.* (Society of Chemical Industry and the Institute of Brewing), 1943, pp. 15, bibl. 97.

*A.R. Field experiments on Sugar Cane in Trinidad for 1942* (Turner, P. E.), 1942, pp. 232 [including A tentative grouping of Trinidad sugar-cane soils on the basis of their moisture relationships, with reference to sugar-cane growth, allocation of sugar-cane varieties and liability to froghopper damage. (Charter, C. F.)].

*Scientific Reports of the Imperial Agricultural Research Institute, New Delhi for the year ending 30th June 1941, 1942, pp. 73, Rs. 1 annas 8, or 2/3.*  
*Administ. Rep. act. Dir. Agric. Ceylon for 1941, Part IV, Education, Science and Art (D), 1942, pp. 15, 30 cts.*